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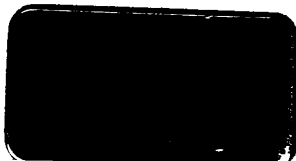
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THE JOURNAL
OF
STEAM TRANSPORT & HUSBANDRY.

UNDER THE PATRONAGE
OF
THE INSTITUTION OF LOCOMOTION.

"Truths would you teach to save a sinking land,
All shew—none did you—and few understand."

SECOND EDITION.

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JOURNAL

OF

STEAM TRANSPORT & HUSBANDRY.

For DECEMBER, 1833.

REVIEW OF THE REPORT OF THE AGRICULTURAL COMMITTEE;

And exposure of the dangers that will arise to the Agricultural Interest, if Steam be not applied simultaneously to purposes of Husbandry and Transport.

THE document that stands at the head of this article—and which was anticipated by the agricultural community, and the nation at large, with the intense interest which an enquiry so long deferred, and imperatively called for, deserved—has now been before the public for a sufficient length of time to have admitted of a mature, and it may be supposed tolerably accurate, estimate of its merits. Therefore, in reviewing the Report, we shall take advantage of the numerous criticisms upon it which have appeared during the interval that has elapsed since its publication, to relieve ourselves of the responsibility of sitting in judgment upon it. Upon a subject of such vital importance individual opinion is but of slight regard when laid in the balance against the finding of a number. We shall avoid exposing ourselves to this objection, and meet the collective wisdom of the Committee by the collective wisdom of the Press. Though we shall work up the *material* so copiously furnished after our own fashion we desire to have it understood that the spirit of the latter is compressed into the following preliminary observations. The extracts that

will succeed them from the *corpus delicti*, viz, the Report itself, will be followed by some remarks of our own.

The Report then of the Select Committee of the House of Commons, appointed to enquire into the present State of Agriculture in the United Kingdom, together with the evidence educed, forms a volume of 707 folio pages:—an ample proof of itself, were all others wanting, of the industry of the thirty-six Honourable Members entrusted with this most momentous investigation. Yet, notwithstanding its bulk, to all who have paid attention to the retrograde condition of the country during the last fourteen years, the Report presents little that was not previously understood. If, however, the undigested compilation of the numerous facts which have been brought together has thrown no new lights upon the subject, it has at least gathered them from afar into one immense conglomeration. The *Swing-fires*, if we may so speak, throughout all the land, those signals of distress which were confined to local observation, have been amassed into a mighty funeral pile—the baleful glare of which is now alike visible as portentous to

every eye in the three kingdoms. No man can rise from the perusal of the Report without coming to the fixed conclusion, that the agricultural interest is rapidly sinking into ruin; and he must be obtuse indeed who does not see that with this fundamental interest all other interests in the country must fall. The faithful interpretation, upon this particular topic, of the Committee's softened Report is, that, beyond all question, agricultural distress generally prevails; that farming capital has rapidly decreased within these few years; and that the effects of that decrease are apparent in a diminution of the stock of cattle and sheep—in the abridged and deteriorated cultivation of the soil—and in deficient unremunerative crops. In a word, the real sufferings of this oppressed class of the community are not exaggerated when we say, "that our tenantry are utterly destroyed—fathers sent broken-hearted to the grave—widows to the workhouse—sons to despair—daughters to ruin—all once the virtuous contented inmates of peaceful and happy homes!"

But if the Report has had its use in making apparent the distress of the agriculturists—it seems to have effected no other beneficial end. "Seldom," says a leading authority, "have we seen so bulky a volume—the work of a public body—containing so little matter really worthy of attention. We have had the courage to dive pretty deep into the immense mass of evidence, in the hope of being able to bring to the surface something calculated to gratify the curiosity, to extend the knowledge, or to correct the prejudices of the public, but we candidly own that we have met with little, or no success. Even the Report itself, though it might have been expected to embody the essence of the depositions taken by the Committee, and to have pointed out improvements conformable to the new information obtained in the progress of the enquiry, possesses scarcely any claims to public confidence or gratitude." Indeed it does not seem to have

given satisfaction to any of the parties who have commented upon it. To use the strong language of another journalist, "it has, in fact, that gloomy and unsatisfactory character which necessarily belongs to a document, which, after pointing out many evils, suggests no remedy that is not to be found in time and patience."

Time and patience! There are cases in which such remedies are worse than the disease; others where, admitting their utility, it becomes a matter of impossibility to administer them. Let us dip into the Report, and see from the symptoms under which the agriculturists labour whether as regards them they will prove either availing or applicable.

"In looking back," says the Report, "to the one made by the Committee, in 1821, to whom the petitions complaining of the depressed State of the Agriculture of the United Kingdom were referred, it will be found that the Report commences by stating, "that the complaints of the petitioners are founded in fact in so far as they represent that, at the present price of corn, the returns to the occupier of an arable farm, after allowing for the interest of his investment, are by no means adequate to the charges and outgoings, of which a considerable proportion can be paid only out of the capitals, and not from the profits of the tenantry."

Such was the conclusion arrived at by the Committee of 1821, but not without expressing "the hope, that the great body of the occupiers of the soil, either from the savings of more prosperous times, or from the credit which punctuality commands in this country, command resources which will enable them to surmount the difficulties under which they now labour." The hope seemed but fair and reasonable:—what then has been the result?

After the lapse of twelve years, during which we have enjoyed fruitful seasons—freedom from external aggression, and domestic repose—here is the finding from the facts produced, "Your Committee, with

deep regret, are bound rather to express a fear that the difficulties alone remain unchanged, the credit falling, and the resources being generally exhausted; and this opinion is formed, not on the evidence of rent-payers, but of many most respectable witnesses, as well as the owners of land as surveyors and land agents."

Such are the circumstances under which the Committee—not without subscribing their formal assent to the correctness of the position, "that the agriculture of the kingdom is the first of all concerns, the foundation of all its prosperity in every other matter by which that prosperity is produced," terminate their labours by "*avowing it to be their opinion, that the hopes of melioration in the condition of the landed interest rest rather on the cautious forbearance than on the active interposition of Parliament.*"

A more lame and impotent conclusion, under the extreme exigencies of affairs, never emanated from a body of men entrusted with a solemn and responsible investigation. Is it at a moment when it is allowed on the one hand, "that the supply of agricultural labour is greater than the demand;" and the apprehension is not concealed upon the other, that "the quantity of land in cultivation has been greatly diminished; and that what is still retained in use is much less perfectly cultivated than heretofore;" that government is to be counselled "cautiously to forbear" preventing our overburdened husbandry from plodding on in the same sad circle of distress to perpetuity? Again, when it is acknowledged, that "farmers have been long paying their rent out of their capital"—that the agricultural capital of the country is upon the point of being exhausted, and the productiveness of the land consequently dried up—that the amount of food has been diminishing in an alarming ratio—and the mouths that ought to consume it have been becoming more numerous by millions—that the misery of the lower orders is daily multiplying, and

idleness and discontent everywhere prevalent—is it less than a mere mocking at our agricultural calamity to say, that "the active interposition of Parliament" is not urgently, nay imperatively, called for?

We suppose the timorous and feeble conclusion arrived at by the Committee, (by which, indeed, nothing is concluded,) was made with the intention of quietly shutting the door upon the Corn-law question, as if the barring out of the enemy from abroad, was sufficient to make all within prosperous and satisfied! Why did the Committee not boldly avow that the removal of the corn-laws, however clamoured for by a party in the state, however countenanced by the anguish and distress of a hungry multitude, would be accompanied, to the nation at large, by evils inevitably more destructive and overwhelming than even those which now grind and oppress us. Is there any thing to be ashamed of in declaring a truth so obvious and incontrovertible? It seems to be taken for a matter of course that the welfare of the agricultural body is a thing of no importance to any other class or portion of the community but themselves. That to oppose the cry now raised against them, is to oppose, alike—reason, and justice and humanity! The agricultural interest nevertheless, is the belly of the body-politic, and let the mutinous members conduct themselves as they may, they cannot survive when the other perishes. It has been no less judiciously than forcibly observed, that the Parliament of 1829 deserved to be cashiered if it had committed no other crime than that simply of refusing to muster forty of its Members to entertain the frequently evaded, or defeated, enquiry into the distressed condition of the agriculturists of the empire. And now that the investigation has actually been made, and the marrow of "the result of the Committee's careful observation is; that during the last ten years especially, the tenants have become gradually more and more distressed; their live and dead stocks have

been reduced lower and lower; their capital has been diminishing, and the land has been so rapidly deteriorating, that soils of inferior description have been taken out of cultivation altogether,"—let Parliament beware how they comply with the DO NOTHING exhortation of their Commissioners, least the fate which their predecessors escaped with deserving, they themselves both merit and endure!

The country is now in a temper not to be trifled with:—rather, the distress has reached a crisis no longer bearable; the schools of the economists have had their day; the fine-spun systems of the reciprocity clique have run their course, and one after another have reached the *чек*! The doctrines even of Malthus and Ricardo, however theoretically entitled to be scouted at, are at the present moment substantially exemplified in our social condition. Society has been too long amused with the brilliant soap-bubble speculations which a set of philosophers have floated upon the popular breath, on the one hand, or with the plain home-thrust arguments of those who have simply contented themselves with poking their walking-sticks through them, on the other! We have talked enough, and now we must act. Shall we then continue the juggle? Or is it at length time to retrace the steps which we have lost in pursuing a phantom? It will be well if society shall discover though late rather than never, that a want of attention to *our social interests* is the true cause of our *social distresses*; and that the only method of *regenerating Britain* will be to make improvement in *Britain* our first—and middle—and last concernment. It is perfectly disgraceful to the age in which we live, and to the position we occupy in civilized existence, that with a larger share of the elements of national wealth than what any other kingdom in Europe can boast of, we have comparatively a larger share of national misery. There is something rotten in our state at home, which demands a

prompt and extensive legislative revision. A change must be effected in our domestic relations. Live and let live must prove our rule in the time to come, instead of being—as now and heretofore—the exception. And conformity to the wise and generous precept of the poet — “EACH AID THE OTHERS.” must henceforth remedy the evils which the maxim “EACH FOR HIMSELF” has accumulated.

In the spirit of these remarks, and having animadverted upon what the Agricultural Committee have not done, we next proceed to shew what under *ordinary circumstances* a simple and direct purpose on their part to improve the condition of the agricultural interest, and through them the interests of the whole community, might have suggested. After stating, as a preamble in general terms, that they found from the evidence produced, that the condition of the farmers was one of deep and universal distress,—that they are not a prosperous body of monopolists, grinding the faces of the other classes to obtain exorbitant prices upon their outlay,—but, on the contrary, an impoverished one, to whom the prices they realize, however they may be considered high, are actually unremunerative,—and that if bread be dear to the buyer, it is equally dear to the seller,—that if the consumer cannot afford to purchase it at what it costs, the grower cannot afford to sell it for what he pockets,—and that, therefore, the condition of both is alike indigent, alike wretched, and alike unsupportable; they might have proceeded to comment, in the terms which it deserves, upon the evil effects which such a system has produced, in abridging national consumption and industry, and the manifest advantages that will mutually arise to the manufacturing, and all other productive classes, from the regeneration of a body so large and influencing as that of the agriculturists. The Committee could then have proceeded to state that they found the production and consumption of the country totally unbalanced, and this arising from

the plain and obvious circumstance that during the last quarter of a century the *conveniences* of life have been increased and cheapened artificially to a vast extent, whilst no corresponding increase and cheapening of the *necessaries* of life has accompanied it. That this circumstance, after proving through a series of years mutually injurious to grower and consumer, has reached a crisis no longer compatible with the well-being of either, and that it is essential for,—not simply the prosperity, but—the existence of both, that it shall be remedied in a way that will prove equally protective to both interests. That cheap food, by foreign importation, curtailing consumption yet more, would immensely aggravate instead of lessen the evil; and that therefore, as a change is absolutely required to preserve the industry and tranquillity of the Country, the Committee might, in all conscience, have felt themselves fully warranted to recommend it urgently to the attention of Parliament that the burdens pressing so grievously upon agricultural skill and enterprise should be forthwith taken off to an extent sufficient to admit of the reduction in the price of food, which is required.

Considering the difficulties in which all classes of the community find themselves placed, and the utter inefficacy of any and every change which shall merely convert public distress and not exterminate it, the Committee might reasonably have proceeded—(after acknowledging that whilst the happiest results may be expected from the change in the Bank Charter Bill, by which the restrictive principle of 1819 is virtually abandoned—from a further reduction of taxation—the contemplated commutation of tithes—and taking off the malt-tax)—to state their best hopes of the permanent and adequate amelioration of the agricultural interest to be founded upon a change in the social economy of the nation; that since the war the fall of rents, and the fall of prices have by no means borne due proportion to each other, a cir-

cumstance which has shortened leases, produced scourging croppage and deteriorated cultivation, with mutual disadvantage to landlord and tenant; that the administration of the poor-rates has been so criminally mismanaged as to allow the evil to grow, by what it has fed upon, to the extent of eight millions and a half annually, instead of being given (to the aged and infirm alone excepted) in the shape of *employment*, of such a sort as shall contribute to their gradual extinction; that the importation of grain into England from Ireland, where rates are unknown and taxes comparatively nominal, along with the starving hordes of wretched peasantry that ought to consume it at home, is highly injurious to both countries, and that a prohibition upon such an iniquitous export may be beneficially compensated to the latter by a tax upon absenteeism, and throwing annually into her hands the 15,000,000*l.* sterling now exported for the flax, cotton, hemp, corn, tobacco, &c.* which nothing but the anti-social system we have hitherto been pursuing has prevented her from raising upon her own fertile surface; while last, not least, the consumption, and consequent industry, of large classes of our producers has been curtailed by the imprudent importation to a vast amount of various kinds of commodities, which can, *and therefore ought to*, be exclusively fabricated at home.

Had such, we repeat, *under ordinary circumstances*, been the scope of the report of the Agricultural Committee, we feel convinced that there is still enough of integrity and common sense left in the country to have rendered a plan, which would have gone far to make a body of Twenty Millions of prosperous consumers at home, be received not simply as a *vox et preterea nihil!*

* We yearly export to America, &c. for	
raw cotton	6,000,00 <i>l.</i>
To Holland and Russia for flax and	
hemp	3,000,00
For foreign corn, tobacco, &c.	6,000,00

£15,000,00*l.*

We live, however, under *extraordinary circumstances*, which render even these suggestions unnecessary. For we stand upon the eve of a total revolution in the domestic relations of society.—One which will alike render vain the endeavours of that party who, true to the interests of their native soil, are determined that Parliament shall exercise a “CAUTIOUS FORBEARANCE” as regards the removal of the corn-laws, and the machinations of that other party, the more numerous by far, who are equally determined that Parliament shall exercise an “ACTIVE INTERPOSITION” for their removal!

The application of STEAM to economic purposes, i.e. to the removal of brute labour, is no longer a matter of doubt. The progress lately made in locomotive science, as the report given elsewhere in this number testifies, warrants the conclusion that the country stands upon the eve of a change in the means of internal transport, which will relieve society of all the evils attendant upon its reaching the *limit*. In sitting, therefore, upon an enquiry into the condition of the agricultural classes, it might have been expected that the Committee would have considered what effect, a coming event which has so long cast its shadow before it, was likely to produce upon the consumption of the country. Though the matter was urged upon their attention, it was however treated with an imbecility or ignorance which strongly characterizes the investigation.

The duty, therefore, devolves upon us, in the prosecution of the object which we have undertaken to advocate; and we discharge it with sincere regard for the safety and prosperity of the first and best of our domestic interests—to warn the landed and farming classes of the danger which will infallibly arise to them unless steam transport and steam cultivation shall be introduced simultaneously.

As long as proprietors had the German Ocean between them and foreign corn, and the House of Commons to fight their bat-

ties, they had little to fear with regard to the Corn Laws, however clamoured against. But now, they have to grapple with an enemy of a very different and most determined description:—even with a foe in their own household! This new assailant, invested with powers commensurate with the wants which it is commissioned to relieve, will march in with an overwhelming rapidity which will set at defiance every species of opposition, except that alone which will provide that *Steam husbandry shall keep pace with Steam transport*.

If this conclusion shall appear to any to be chimerical, let them consider the immense spirit of enterprise abroad just now as regards rail-roads; and then estimate what the introduction of Steam carriages will be when the millions of capital now proposed to be expended in laying down rails shall be laid out simply upon engines. Nor is this all—we have to add likewise the impulse which will be given to the substitution, when society, as a body, shall cease to view it in the mere light of its commercial importance. But when the whole of our starving classes shall come to regard the project as a mode of obtaining cheap bread. When the whole of the unemployed classes shall contemplate it as a mode of procuring abundant labour. When the whole of the manufacturing classes shall contemplate it as a mode of balancing, at home, consumption and production. And last, not least, when Government itself shall contemplate it as a mode of raising those resources which they can no longer obtain by taxation.

From the Parliamentary returns, the horses running in coaches in Great Britain in 1828, amounted to 178,841; and we are probably much within the mark when we suppose that these, with all other horses employed in drays and draught exclusively, amount to 600,000. It seems to be admitted that each horse consumes what will support eight individuals. The suppression therefore of these horses alone (which

does not include one horse employed in agriculture or for pleasure), will save what will feed 4,800,000 people. The annual consumption of grain by human mouths in Great Britain (viz. 16,000,000), is about 32,000,000 quarters, of which not one-twentieth part has during any year been imported. But the saving of what would feed, by the removal of the horses used for transit alone, 4,800,000 people amounts to more than what is consumed by the fourth part of the said population. If importation then of grain to the very limited extent of one-twentieth, viz. 1,600,000 quarters has hitherto been deemed an evil of no little magnitude by the agricultural interests, what will they consider a system which will abridge home consumption equal to *one-fourth*—viz. 9,600,000 quarters?

The farming interests may postpone the consideration of this subject; *but their doing so, will not postpone the immediate application of Steam to transport.* Let them bear this in mind—they will not repent of doing so. These calculations are not founded upon the mere *ipse dixit* of anonymous authority. They are taken from sources that have long been accredited by the public; and though they may nevertheless be widely inaccurate, they approach sufficiently near to the truth to render their rejection deeply disastrous to those for whose advantage they are offered.

It does not become us to suggest the practical steps by which this new danger may be avoided, but merely to point it out, and call upon the landed interests not to delay in preparing to meet it. It belongs to the Nobility, the Land-owners, and Agricultural Societies of England, to adopt the ways and means necessary to bring steam husbandry into immediate practice. The cheaper mode of cultivation which it will permit will enable them not only to withstand, but triumph over the substitution. In the second number of the Journal of Elemental Locomotion statements are offered which go far to

prove that the horses now used in husbandry alone are maintained at an expenditure of 30,000,000*l.* yearly; whilst it is calculated in the fifth number, that in ten years the profit in favour of a Steam Plough over a Horse Plough, will show a balance of 775*l.* making all allowances for the expenses incidental to the first introduction. It is not difficult to see how the substitution will effect a great cheapening of agricultural produce with remuneration to the growers; though to what extent this reduction will be made, can alone be decided by time and experience.

It is true that the same progress has not been made in steam machinery for purposes of cultivation as has been attained for conveyance. But it is also true, that this is the consequence, not of want of mechanical ingenuity, but of the lukewarmness with which the project has hitherto been regarded by agriculturists. The power of inanimate locomotion has been gained—and it can be made to assume the requisite modification, the moment the necessary encouragement is afforded. Mr. Phillips' *Cetomac Apparatus*, described in the fifth Journal, though by no means a perfect machine, is yet sufficient to shew that a little further ingenuity will make it such. It is however, one of the objects proposed by the Donation Fund of the Institution of Locomotion to offer a premium for a Steam Plough capable of being applied to practical purposes. But allowing that this should be a desideratum for some time to come, the expense of husbandry may even now be considerably cheapened by farmers getting partially rid of their horses, by using steam engines in their drags, reaping machines, thrashing-mills, &c. Steam has been applied for some time past to the latter purpose in various parts of Scotland.

We know that there are many of opinion that this scheme of applying Steam to Agriculture is perfectly visionary. Many who consider a plough to be propelled by Steam just as probable an event as a plough to be

drawn by whales. Well! but what then? let them cling to their scepticism, it will at best only retard, not prevent, the substitution. Do the public forget, that ten years ago there was not an Engineer in England who did not hold it to be an axiom in mechanics,—that the periphery of a wheel had not sufficient bite upon the ground to render it an available fulcrum for the propulsion of a vehicle? It is not to the eminent in mechanical science that we are indebted for the solution of a problem, which is at once the mightiest and the most beneficial of inventions. No! he whose name is entitled, and yet destined, to receive the gratitude of his country and kind more than all they who have walked before him in the physical development of this mighty agent, is one whose apprenticeship was served in the chemist's hall, whose profession is the lancet! Did therefore the weightiest authority in that department, to which in especial such enquiries belong, state to us his conviction that Steam cultivation is wholly impracticable, we would value his dictum upon the matter no more than that of his milk-maid. We know what Steam has done, we know not what it may yet do. Let engineers beware how they stultify themselves further by limiting ingenuity. It is not temerity simply which, at such a crisis, shall stand in the way of a modification which is absolutely essential to the *preservation* of British Agriculture. Again, on the other hand, we have addressed ourselves upon this subject to many prominent individuals in the science of husbandry. If the names of Sinclair, Coke, and Blamire, &c. are not to be found in the list of its supporters,—nay, if even the proprietors of England, as a body, were to publish their resolution to take neither part nor lot in the matter,—still, what then? Would it cease to move onwards? No;—Dame Partington's attempt would not have been more abortive to mop back the ingress of the Atlantic Ocean!

We stand sufficiently behind the scenes to speak warmly upon this subject. We

do not forget, in the words of the *Christian Advocate* when recommending it to the support of the benevolent, that "the convulsions which our mercantile community has experienced within the last few years, seem to have produced a narrow-mindedness and selfishness amongst its wealthy members, which has reared a species of barrier betwixt capital and labour, until misery has been the consequence alike to the horder and the starver"*! Neither, that *The Times*, in the leading article upon the corn-law discussion, in May last, thus commented,—“There never was dissatisfaction more generally expressed, by the town and country, than that which has been excited by the protecting duties on corn. How came the House of Commons to differ with the majority of their constituents on that important question? Was it that Honourable Members desired individually to propagate an eagerness for REVOLUTION?” And again, “The public murmurs at the indifference of Parliament, and of the upper ranks of Englishmen to the wants of their poorer brethren, have really grown to a frightful magnitude, and betoken SOME TRAGIC RESULT!” Yes, the whirlwind of political opinions has swept over us, but the ground-swell of popular distress remains behind! We can subscribe—and we do it rather in sorrow than in indignation—to the justness of both these detractive accusations. We have already knocked at the doors of one half of the nobility of England, to give their support to this project, and we have knocked in vain. Not one English Peer has, as yet, vouchsafed it the furtherance either of his influence or his purse. Yet how exigent is the want which it is commissioned to alleviate, and how reckless in its consequences, that volcano indicates whose eruptions are nightly visible in the farmyards of every district of the country!†

* September 4, 1833.

† “We lament to state” says that able paper “*The New Farmers Journal*” of last week, “that in several parts of the country, particularly in the Counties of Norfolk and Sussex, the devastating

We need say nothing then upon the importance of Parliament and of Proprietors as a body going hand in hand to urge forward this great project. Were all other motives wanting self-preservation will force the latter to give it their support; whilst, whether viewed commercially, morally, or politically, it has the most powerful claims upon the protection of the former. At the same time, we only consider it fair towards the manufacturing classes, to whom cheap bread of home growth ought to be infinitely preferable to cheap bread from importation, to state that we consider the agricultural interest bound to adopt this cheaper mode of raising food by every principle of fellowship and honesty. Public industry and happiness alike demand that nobody in the state should make a monopoly of their productions, but should avail themselves of every improvement to make them bear an equitable price to other commodities. If this is just in ordinary circumstances, what is it at a moment when predial and urban destitution are bringing the largest divisions of our population into collision? Now it must be kept in view, and we think we do the landed classes *some service* by reminding them of it, that, —(when the poor-rates are subtracted from their incumbrances, which nothing but their criminal mis-management has perpetuated and increased, and the tithes, which a strong pull on their part will get commuted, and that they are exempt from the legacy and auction duties, and from the house and window duties)—the land-tax in this country has remained absolutely stationary for the last 140 years, whilst those of the continent have been in a state of constant and progressive increase; that whilst the French land-owners pay 12½ per cent. on the nett produce of their lands, the British pay only about 3; that, in the reign of William III. the land-tax was one-fifth of the land-rents, whilst

in the reign of William IV. it is about one-fifteenth;—that then landlords paid nearly *one-half* of the public revenue, now they contribute about the *twenty-fifth* part.* But this is not all—of the agricultural system now in use in England, it may be more truly said than of any other, that there is *something rotten in it*, whilst all the other producing classes have *artificially* decreased the expense of their respective modes of labour, the agriculturists have actually increased theirs. The Returns to the Board of Agriculture shew that the expense of cultivating 100 acres of land in 1790, was 411*l.*; in 1803, 547*l.*; and in 1813, 771*l.* With all due allowances for increase of taxation, and superior farm management, this is not what it ought to be. Whilst, therefore, we consider the protection of our domestic agriculture the first duty of the state, we do not depart from insisting in the name of the manu-

* A Correspondent of *The Times*, December 7th, enables us to make the following statements:—

The wages of labour are, upon the average, from 75 to 100 per cent. higher in France than in the United Kingdom.

The population of France is 32,000,000: the contribution in kind, per head, 314*lbs.* of flour. The population of the United Kingdom is 24,000,000: the contribution ditto 228*lbs.*

The French nation, therefore, collectively furnish 79 per cent. more to Government than the British nation collectively; the French nation individually 37 per cent. more than the British individually. Yet, paradoxical as it may appear, the Frenchman in consequence of the low price of food is less heavily burthened than the Englishman. If the income of each be 100*l.* and each pay 25*l.* in taxes, the 75*l.* of the former will buy 14,483*lbs.* of flour; the 75*l.* of the latter, 8,400*lbs.*—ergo, the resources of the one for the conveniencies of life is 72 per cent. greater than the other.

Further, the French Agriculturists contribute 16,000,000*l.* sterling beyond their fair proportion to the public revenue; the English Agriculturists 4,000,000*l.* less than their fair proportion.

The corn-laws impose a tax, it is computed, of £40,000,000 upon the nation. The labouring classes contribute about 8,000,000 to the Government taxes, and at least 27,000,000*l.* towards the bread tax. How important then that change AT HOME to our manufacturers, which will permit of this sum being expended upon commodities. The "*Anti Corn-law Societies*" should all change themselves into "*Pro Steam-Husbandry Societies*."

hand of the midnight incendiary has been employed to a frightful extent. We look forward with fearful apprehensions to the coming winter."

facturing and other classes, that one of two things shall be adopted, viz.—either reduction in the price of food, by the cheaper mode of cultivation now put within their power; or TO ABIDE THE CONSEQUENCES.

It is truly fortunate for all parties that if the former be wholly unavoidable to the agriculturists it is also wholly desirable. The bane of having prices reduced, by Steam transport, and the antidote of providing for the same by Steam husbandry, are both before them. We cannot suppose that the one will be unaccompanied by the other. We conclude, therefore, this article, congratulating all orders of our fellow-subjects upon the bright prospects which the general application of Steam to economic purposes opens upon us. At a moment when the resources of the country are no longer adequate to the wants of our population—"WHEN A RESTLESS SPIRIT OF DISCONTENT IS EVERYWHERE ABROAD"—and cheap food of home growth is a *sine qua non* to an ameliorated condition, this beneficent agent steps in to accomplish what could not have been effected by any external process whatsoever. The speedy and general introduction of Steam cultivation is all that is required to make cheap bread in England, in a way that will reduce no one to destitution in England. If our industrious classes must still earn

and eat their bread by the sweat of their brow, they shall nevertheless eat it in plenty and contentment. Under the social economy which the extension of Steam to the purposes of brute labour will allow, it shall no longer be said that the wealthiest empire in the world is also the most wretched one; or, that with all our boasted wisdom in science and art, we are unwise in that which not rightly to know is misery and unhappiness! The better policy of the age of Steam must be to make the millions rich instead of the units—to render monopoly the property of the state and not of the stock-jobber—to comfort a thousand happy homes, instead of building up one bloated capitalist. Steam, which, confined to physical purposes hitherto, has wrought such marvels, extended further to economic, can achieve all this—for by home means, equalizing the price of necessities and conveniences, it will adjust PRODUCTION AND CONSUMPTION: the unbalanced condition of which, alone, has deranged the currency—paralyzed transaction—abridged industry; and, in a word, occasioned all those evils which at length have produced a nation divided into usurers and debtors, to the danger alike of the constitution, the altar, and the throne.

RAIL-ROAD IMPOSITIONS DETECTED;

Or, Facts and Arguments to prove that Rail-roads never can compete effectually with Canals—Steam Carriages on Common Roads, or even Stage Coaches. Comprising a critical and statistical Review of all the Estimates now before the Public, both for construction and revenue; with comparative Tables of the ACTUAL and the ESTIMATED cost and profit, &c.; thus presenting the only SAFE guide yet published for future Investments.

The following able Article will go far to settle the whole money question, as to whether Rail-roads be or not a profitable speculation; and have only to add, that it is not the first time that our valued Correspondent VERITAS has done the State some service, by exposing the errors and mis-statements of Engineers and Speculators.—Ed.

At a moment when the *mania* for Rail-way speculation is not unlikely to involve at least SIXTY MILLIONS of capital, should all the 3,000 miles be laid down which have been contemplated by the Treasurer of the Manchester Railway, it may not be uninteresting to prove to the satisfaction of those most prejudiced in their favour, how perfectly unable Rail-Roads are to compete with Canals,—Steam Carriages on common roads, or even Stage Coaches.

That rail-roads have a decided superiority over all other methods of conveyance yet adopted, is certainly true, but only where great weights are required to be carried very quickly, and without regard to expense.

For example:—Locomotive engines, on the Manchester and Liverpool Railway, have drawn 90 and even 100 tons at one time, at the rate of 20 miles an hour; being twice as great as Boats on the Paisley Canal, and Steam Carriages on common roads.

But as the whole weight carried, in the most profitable half-year of the Manchester and Liverpool Railway, as shewn in Statement No. 1, was 90,972 tons in 5392 trips, averaging about 17 tons per trip at most, as the profitable weight; it is plain, that as the engine, tender, fuel, water, and attendance may be said to average about 12 tons, the weight not profitable was more than *two thirds of the whole weight carried*. Assuming, therefore, the whole estimated

burthen carried on the Railway, to be 4,000 tons daily, for 312 days, or according to the original estimate 1,248,000 tons, the total weight paying NOTHING to the Shareholders would be in the same ratio, at least 880,941 tons.

Hitherto, the calculation has been made on the supposition that no carriages or waggons travelled empty. But from the statement issued by the Directors for instructions to Messrs. Rastrick and Walker, dated 12th January, 1829, the following calculation is made, shewing that the total weight paying no toll daily, to carry 2,970 tons of profitable weight would be as under:—

Waggons and empty waggons from	Tons.
Liverpool to Manchester . . .	2,180
Ditto from Manchester to Liverpool	2,500
Ninety-six engines and tenders, at	
10 tons each	1,960

Total dead weight paying no toll . 6,640

Thus, if 2,970 tons of profitable weight cannot be carried without 6,640 tons of weight paying no toll, 4,000 tons of the former would burthen the railway with 8,942 tons, which, for 312 working days, would be 2,789,904 tons, paying *nothing*, for 1,248,000 tons of profitable weight; thereby shewing that the Rail-road must carry nearly *twice* and a third of the whole profitable weight GRATIS, to make even a gross profit of 7½ per cent. per annum.

according to the last half-year's income. Thus explaining why the expenditure in the waggon department was 73½ per cent. of the income, while in the coach department it was only 44½ per cent. See Statement No. 2.

But, it will be said, that the question is not about the surplus weight, or the amount of expenses generally, but whether a satisfactory return can be made for the capital. To this however it may be replied, that the gross weight not only does now, but must shortly diminish still more fearfully the dividend. For the weight paying nothing, is yearly giving birth to fresh expenses, exceeding already 14000*l.* per annum for repairs alone; whilst it threatens, at no distant date, to stop the railway altogether. That this is no designedly mischievous view of the case is proved by the fact, that every year has actually produced a diminished dividend, although the goods for conveyance have increased nearly cent. per cent.

Of this unpropitious finale to a plan, that opened with such fascinating prospects, the cause is to be traced to the mis-calculations of those, who, devoting all their mind to producing velocity of transport, overlooked every fact likely to impede the prosecution of a speculation, that could not fail to be a mine of wealth to engineers, surveyors and solicitors, whatever it might be to the less fortunate Shareholders themselves.

The extent, to which these mis-calculations have been carried, is such as almost to stagger belief. Some of the estimates, it is true, have stated in round numbers the probable cost; and a few have even condescended to enter a little into detail; but the majority have wisely failed to furnish any data at all; the projectors being well aware, that some *influential* names were all that were necessary to blind the avidity of capitalists, who depend more upon the integrity of ignorant Committees, than upon their own good sense.

That these mis-calculations have been

wilfully made, far be it from us to assert. All that we are anxious to impress upon the mind of the public is, that in questions of apparently easy solution, engineers, publicly announced as the "most eminent," and surveyors of "undoubted talents and activity," are not only confessedly at variance with each other, but even with their own statements.

For example:—After the Manchester line had been twice surveyed, and all the levels taken by engineers and surveyors, declared by the Directors to be of the highest character; and after more than 20,000*l.* had been paid for their labours, no sooner were they examined, in May, 1825, by a Committee of the House of Commons, who were no engineers at all, than, says Mr. Treasurer Booth, in his Treatise on the Railway, (p. 18), "a considerable ERROR in the levels and sections was found to have been committed; and upon that ground, as well as upon others, the Bill was rejected for the time being, with the exception of the preamble, which was carried by a majority of one in a Committee of 73.

A fresh estimate was then issued by the Directors raising the capital from 400,000*l.* to 510,000*l.*; that is, from 12,000*l.* to 17,000*l.* per mile, and in order to produce the most perfect confidence in the accuracy of *this* estimate, after all the previous blunders, it was stated "that to avoid all chance of *similar* complaint in future, the Committee had engaged the professional services of the "most eminent" engineers, aided by assistants of "undoubted talents and activity;" whose combined efforts justified the fullest assurance, not only of the correctness of the plans and sections, but that the whole line would be arranged with that skill and conformity with the rules of mechanical science, which would equally challenge approbation, whether considered as a national undertaking of great public utility, or as a magnificent specimen of art."

Unhappily, however, not even the "most eminent engineers," nor the "undoubted

talents and activity of the Surveyors," have been able to prevent a *fourth break down* in the professional estimate, the cost having risen from 17,000*l.* to nearly 40,733*l.* per mile. See Statement No. 1.

Before, however, we proceed more particularly to point out other errors in the calculations for the Manchester line, it may be as well to remark, that the dexterity exhibited for *mystification*, appears to be quite equal to the talent for *miscalculation*.

Among the fascinations in the Report of the Directors, in March, 1832, the Shareholders were told that the expense of Omnibus accommodation was no longer to be paid by them, but by the public. The cost for carrying passengers in the half year ending 31st of December, 1831, is stated to be 2*s.* 0½*d.* each, including 3½*d.* or about 15 per cent. for Omnibuses; yet, in the last half-year the cost for passengers, instead of being 1*s.* 9½*d.* averaged about 2*s.* 10½*d.*; thus adding to the cost more than four times the amount of the whole saving professed to be made by the Directors fifteen months previously!

So, with regard to the revenue, the picture was equally flattering. For the carriage of goods was estimated to produce 50,000*l.* per annum. or 5 per cent. on one million of the capital; instead of which, the half year ending 31st of December, 1831, did not even yield one per cent. In two whole years, 1831 and 1832, it did not average yearly 2 per cent. and in the last half year, only 1½ per cent. The coal and turf was estimated to return 20,000*l.* per annum; yet, the utmost they have produced in eighteen months is less than 2,300*l.*

Among other delusions, previous to the opening of the Railway, it was said by some of the engineers, that in proportion as the speed was increased, the expense of conveyance would be diminished, as the engines, by doubling their speed, would do, in the same time, double work. Accordingly, Messrs. Stephenson and Locke,

in their original estimates, calculated the expense of an engine doing 936 trips yearly, or three trips per day, at the rate of 15 miles per hour, dragging a dead weight of about 30 tons, at 324*l.* 12*s.* 10*d.* including a sum of 54*l.* wisely laid aside each year for replacement of engine and interest on cost, so that the estimated expense for motive power, was calculated at less than 6*s.* 6*d.* per trip.

The exact number of 30 mile trips made by the engines on the Liverpool Railway in the most productive half year, ending 31st of December, 1831, was 5,392, of which, 2,944 were with passengers. The total profitable weight carried, including passengers at 15 to a ton, was as before stated, about 17 tons, instead of 30 tons; yet the expense or cost of these 5,392 trips for coke, wages, and repairs alone (allowing nothing for replacement) was 12,203*l.* 5*s.* 6*d.* or a little above 2*l.* 5*s.* 3*d.* per trip, instead of 6*s.* 6*d.* per trip; or the bare cost of an engine doing 936 trips was 2,107*l.* 14*s.*, instead of 270*l.* 12*s.* 10*d.*, thus proving two eminent engineers to be out in their calculations, in this item alone, more than seven times over!

To prove also how strangely some of our Reviewers are out in their calculations as to the capabilities of this Railway, Dr. Lardner states in his Treatise, that the Locomotives actually travel over it, 25,000 or 30,000 miles without any expense whatever for new tubing; yet, in the same half year as last alluded to, the charge for repairs and attendance on the Liverpool Railway Coaches is stated to be 7,455*l.* including 3,254*l.* for Omnibus accommodation; leaving, therefore 4,201*l.* for repairs and attendance alone. The number of 30 mile trips being 2,944, the total number of miles was 88,320, and as 12 out of 24 engines employed may be considered actually engaged in the Coach department, it follows, that instead of these engines travelling 30,000 miles for NOTHING, they cannot travel even one quarter of the distance without an expense of 4,201*l.*

In confirmation of this result, the Directors state in their Report, July last, that "the expenses include the cost of two new engines. But a considerable saving is expected to take place by the recent application of *brass tubes* in the engines, in lieu of copper tubes, previously used, which were almost continually bursting," so that where the Doctor got his data for the wonderful economy of the engine, the next edition of his work will perhaps explain.

But one of the most vulnerable parts of the whole question is, the bare cost of keeping the Railway fit for use. For this expense, under the head of "Maintenance of Road" i.e. a sum not only more than 14,000*l.* per annum, sufficient to pay five per cent. on 280,000*l.* annually, but instead of being a mere bagatelle comparatively, as originally estimated, it actually now threatens, at no distant date, to stop conveyance altogether upon it, till the road is re-laid throughout the whole distance.

The Foreign Quarterly Review, for October, 1832, observes, "The rails are not supported uniformly by laying on the surface of the road, but rest upon stone pillars or sleepers, as they are called, placed at distances of a yard from each other; and as the great weights pass over them with considerable velocity, these sleepers are driven deeper into the ground; so that the Rail-road soon becomes uneven, one rail having one direction, and the next a different one. Though these defects are not easily detected by the eye, yet they are very sensible upon close inspection with instruments; and still more so by the carriages that pass over them, as the wheels in passing over the joining of two rails, receive a severe jolt, and also a change of direction. Driven first on one side of the road, then on the other, the carriage rocks like a ship at sea; whilst, at every swing, one wheel or the other strikes a rail with considerable violence."

Another writer, (Mr. Vallance) after much investigation, adds, "The stone blocks or

bases which carry the rails are two feet square. The weight of the large locomotive engines is above ten tons, more than half of which being thrown on two of the wheels, each block has three tons weight on it, when those wheels pass over it; consequently the pressure upon every square inch of the foundation is above four times as much as in the boilers of Bolton and Watts' steam engines, from which result, the sinkings and drivings into the ground alluded to in the Foreign Quarterly Review. In fact, there are in the whole, including every liability to derangement and repair, above 80,000 parts or places in every mile of the Manchester Railway where adjustment or repair may daily be required."

But let us see how this same item will affect Steam Carriages on Common Roads:—First. It should be remembered, that five or six years must be lost altogether, besides a very large sum in *interest* alone, before Rail-Roads for long lines can be constructed, even for the chance of income; and then at a cost, which, as compared with turnpike roads, and the Manchester Railway, is as 40,733*l.* to 1,500*l.* per mile, or more than twenty-seven times dearer than the latter. But, according to the plan of Sir Henry Parnell and Mr. Telford, the expense of a stone railway to Birmingham will be about one-tenth of the estimated cost of the iron railway by four engineers; whilst, on the principle recommended by Colonel Macerone, even new lines will be wholly unnecessary.

Secondly. Steam Carriages have not to wait five or six years, or a single moment for income, having 22,000 miles of road ready made for their use, besides the benefit of not being constantly burthened as the Locomotives on the Manchester Railway are, with a drag to each wheel more than 400 times heavier in the shape of the first cost; whilst instead of paying 488*l.* per mile for repairs, or "maintenance of road," Steam Carriages can maintain their road by paying merely two-pence or three-pence-halfpenny per mile for every mile they

travel on it, and not before they *do* travel on it; whereas, the Manchester Railway must pay annually in *interest* or toll, more than 2,000*l. per mile*, besides the 488*l. per mile* for repairs, whether the road be used or not; whilst the stone railway repairs will cost not more than 30*l. per mile*.

Thirdly. It may be said, that Steam Carriages never will succeed, owing to the complexity of the machinery, and the impossibility of freeing it from the effect of jolting, and wear and tear, on the common roads. But this, like all other objections, must surrender at last to the ingenuity of man. Already has the whole construction been simplified and reduced to a very small compass. The Inventors have far excelled the Inventors of Railway Locomotives, ten to one in speed off their own road. For not one of the latter can move effectually, if at all, on a turnpike road: an assertion supported by the evidence of some of our most enlightened engineers before a Committee of the House of Commons, on the principle, that locomotive engines on the common road, must carry with them from 21 to 25 times greater power than they want on the railway. Besides, the boilers used on the railway will not bear a pressure of more than 50 or 60 pounds to the square inch; whilst the boilers used on the common road, drive the carriage along at the rate of ten or twelve miles an hour, and bear a pressure of 150 to 200 pounds to the square inch (or more if necessary) that is nearly four to one greater than the Railway Locomotives.

Nor are the boilers of Railway Carriages constructed on a principal of perfect safety, being all recipients of great diameter, strong merely by *thickness* and *weight* of metal; but sure to commit sad havoc should they happen to *burst*. On the other hand, the boiler of the Steam Carriage patented in July last by Colonel Macerone and Mr. Squire, as well as by Lieutenant-Colonel Sir Charles Dance,

Messrs. Gurney, Hancock, Ogle, and Heaton, Brothers, are constructed on a principle of separation and division, thereby rendering it next to impossible that any explosion, or rather *opening* should occur; and even if it did, the effect would be absolutely so harmless, that any one riding on the top of the boiler would scarcely know that such an opening had been made. For the only inconvenience that can arise, is the stoppage of the vehicle. These assertions have been proved over and over again, by the repeated burstings or *openings* of some of the boilers, or rather tubes, during experimental trips, close to the backs of the passengers, owing principally to the *corroded* state of the boilers, but not to any defect in the principle, nor with any other annoyance than *delay*. Had this not been the case, a Committee of Engineers, headed by Mr. Telford, would not, after such occurrences under their own eye, pledge themselves to the full practicability of Steam Carriages, at a speed *not attainable* by horses. In fact, even these accidents will shortly be made almost impossible: and steam Carriages rendered as free from delays as they are now destitute of all danger to life or limb on common roads. Yet, says Investigator, p. 107, "more fatal accidents occurred upon the 31 miles of Iron Railway between Liverpool and Manchester, in three months, than upon all the road between London and Birmingham in so many years."—Witness the late Mr. Huskison, the Engineer's own brother, and many others, the names of whom, it is said, there is considerable reluctance in declaring.

Besides, turnpike roads can and will be made *suitable*. One of our most intelligent engineers, Mr. Macneill, in his evidence before a Committee of the House of Commons, observes, "If, on the road from London to Birmingham there were a portion laid off on the side of the road for Steam Carriages, which could be done without difficulty; and if it were

made in a solid manner, with pitching and well broken granite, it would *fall little short of a Rail-Road.*" The Commercial Road, for example, is confirmatory of Mr. Macneill's suggestion.

Colonel Macerone, late aid-de-camp to Murat, King of Naples, a well-known distinguished officer and writer, has also edited a pamphlet on this subject, published by Wilson of the Royal Exchange. The *Times* of the 1st of November, 1833, in noticing this work, observes:—

"This is Colonel Macerone's plan, and it appears more simple, sensible, and feasible, than any other yet proposed; and far less expensive, so the sooner it is adopted, the better for the public," &c.

The Colonel describes the principle of his plan as under:—

"There is a certain, infallible, and very cheap method, by which almost every advantage of the Rail-Road might be applied to every ordinary road, except, I say again, on such lines as Liverpool and Manchester; the like of which there is not in Europe. If two lines of pavement, composed of stones, six or eight feet long, and one to two feet square, were laid endways, along each side of the road, a track would be formed at a very cheap and durable rate, along which Steam Carriages would most undoubtedly easily travel, at the rate of twenty miles the hour. There need be no levelling of hills—no filling up of hollows—no levelling of any kind; nothing but to keep to the surface of existing roads. The two lines on one side would be for Steam Carriages going one way; the other lines, for those travelling in the contrary direction. If the road be kept on a level with the surface of the long stones, the carriages could easily quit the stones for any momentary necessity. A well-paved road is a good thing in itself; but a road to which such lines of long stones shall be applied, will allow of a velocity equal to that of a rail-road, at one hundredth part of the expense. All ordinary hills will be ascended and descended

with ease and rapidity; and the road will be equally open and serviceable for horse carriages.

"With regard to the wear and tear of the long stones, or parallopepidons, which I recommend to be laid on all high roads for the use of Steam Carriages, no inconvenient wear will take place on their surfaces for the space of two or three years. When it does, all that will be required, will be to turn them over so as to present a new side to the surface; and after another lapse of time to do the like, until all the four sides have been worn in their turn. After this, the parallopepidons may be submitted to the stone-mason's chisel. In laying these long blocks of stone, care must be taken that they do not sink so as to form disjunctions at their ends. To this effect, piles of wood of about a foot square, and from two to three feet long, previously soaked in hot coal tar, must be forcibly driven into the road, so that the ends of each of the long stones shall rest on the surface of the pile, by which means, if they sink at all, they will both sink equally and together. But on the construction of such roads, I shall treat more at length and more minutely, when required, at a future period; I will only repeat, that along such a road, whether hilly or level, such Steam Carriages as our's would travel at the average rate of, at least, twenty miles the hour, including stoppages, with ease and safety."

To shew also that other minds have been at work preparatory to making roads more suitable for Steam Carriages. Sir Henry Parnell has recently written a very elaborate and able Treatise, explanatory of the principles on which roads should be made, with plans, specifications, and contracts actually used by Mr. Telford on the Holyhead Road. And a Company is now forming to turn, in effect, one side of the turnpike road into a Rail-Road for Steam Carriages, without "separating parts of estates and fields, with immense gashes and mounds," and without fixing a drag to the wheel of any of the vehicles travel-

ling over it for first cost, heavier than a few pence in toll, for nearly all the facilities to be had on a railway only made of stone instead of iron. For this Company was formed after a Committee of Engineers* had travelled to Stoney Stratford, 52½ miles from town, in the Carriage of Sir Charles Dance, and witnessed with their

own eyes facts quite sufficient to satisfy them, that Steam Carriages can be made to run *continuously*, with perfect safety, and at a speed greater than can be attainable by horses; whilst the *profit* to the Shareholders, as compared with Railways or Stage Coaches, will be as under:—

ESTIMATED CONVEYANCE BETWEEN LONDON AND BIRMINGHAM.

Steam Carriages on the Turnpike Line.

Passengers daily.	Capital invested.	Profit per cent.
500	£350,000	20 †

Steam Carriages on the Railway.

1,424	£3,500,000	8 ‡
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Stage Coaches.

550	£120,000	10 §
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✎ But mark, by Statement No. 1, of the following Article, it appears that Steam Carriages, exclusive of the outlay for forming the roads, can be worked at a return of cent. per cent.; whilst the actual return upon the Liverpool and Manchester Railway, as compared with the estimated profit on the Birmingham line as above stated, although possessing ten-fold advantages over the latter, does not amount to 2½ per cent. for the half year ending June last. See Statement No. 2.

But as the weight of TAXATION is such, as to compel all classes of the community to obtain the maximum of labor, at the minimum of cost, can any step be taken more likely to advance that object, than one calculated to facilitate Inland Communication, by the substitution of a power cheaper than rail roads, and more expeditious than stage coaches?

To arrive at this desideratum, men of genius and enterprise have directed their attention for more than half a century, and expended a large capital in various efforts to bring to perfection Steam Carriages on common roads. Oliver Evans was the earliest to introduce the principle in America; Symmington in Scotland; and Gurney in England. The first in 1772; the second in 1786; and the last in 1825.

Mr. Gurney was no engineer, but a chemist, yet did he build a Steam Carriage, and actually proved by its performances

more than any man had been able to accomplish, the practicability of pre-conceived impossibilities in the judgment of some of the most eminent engineers.— But shall the author of such a boon to his country be driven to the Land's End like an exile, with his resources almost exhausted, in an honest attempt to serve himself and the Nation at large? or, are we to wait till he quietly descends into the tomb of his ancestors, and then raise a monument to his memory in *mockery* of the benefits received?

Sir Charles Dance, though no engineer, next followed the example of Mr. Gurney, and by some valuable improvements in the plan of his predecessor, succeeded in building a carriage, which has already travelled the best part of 5,000 miles. Among numerous other trips, including the grand experimental trip by the Committee of Engineers, we see by a Treatise published by Simpkin and Marshall, that Sir Charles Dance completed one journey from London to Brighton and back, *without any failure in the machinery.*

* See Report, following Article.

† See following Article, Statement No. 3.

‡ See Statement No. 2. of this Article.

§ See following Article, Statement No. 4.

Colonel Macerone is no engineer, whilst his co-patentee, Mr. Squire, is one of our best operatives; yet the practical skill of the latter, aided by the ingenuity and talents of the former, has produced a Steam Carriage which justifies the Editor of the last *Mechanics' Magazine*, in saying "we see enough to justify us in coming to the conclusion, that Messrs. Macerone and Squire have, in truth, produced a very capital machine, and one which might be safely left to bear the brunt of competition, on its own unexaggerated merits." It has travelled more than 2,000 miles for days, weeks, and months together, at rates varying from 10 to more than 15 miles an hour, and repeatedly to Windsor and back, including all the steepest hills round London, even when some have been newly gravelled, at a speed of seven miles an hour; whilst the cost for repairs is represented to be considerably less than any other steam carriage proprietor has yet stated.

Messrs. Hancock, Ogle, and Heaton Brothers, are not less entitled to credit, for the efforts which they have used to perfect the principle of Steam Carriages. Each having travelled over many hundred miles

of ground; the latter 78 miles in one day without any failure in the machinery; whilst Mr. Hancock has actually run for hire for many weeks together, from Paddington to London: so that no very long time will elapse before each of these carriages may be expected to take the field permanently and successfully against horse coaches.

The only question is, which is the best Steam Carriage? And the most effectual way of solving the problem is, for the government to do as they have done in the case of chronometers, and the discovery of the North-west Passage, and that is, to offer different premiums for different Steam Carriages, in the ratio of the reduction they can effect in the cost of transport on common roads; and as soon as a carriage shall prove its claim to such reward, to give a further sum, not exceeding a reasonable per centage for previous outlay: thus exciting the talent and ingenuity of the kingdom to still greater efforts, and finally accomplishing the grand object.

Having thus noticed the claims of these competitors for the best method of cheap conveyance, we resume our review of Railway estimates.

ESTIMATES FOR REVENUE.

With regard to the estimated Revenue for all the Railways now before the public, it should be observed, that the whole of the promoters are quite right in taking as a basis for their calculations the proportion which the expenses bear to the income on the Manchester line. But unfortunately for the shareholders, some have *accommodated* the ratio to a basis of a very different kind, not from dishonesty so much, as from an over desire to fascinate others with a liberal display of profits; by reducing the *actual* cost in some cases 40 and nearly 50 per cent.; whilst they have added at least 75 per cent. generally to the revenue, more than is likely ever to be realized, after adding to the cost the whole sum *minus* for construction and otherwise.

But we see no reason why the ratio should be thus *decreased*, on the following ground:—

1. According to Mr. Stephenson, jun. the first five years will be the most expensive, owing to blocks sinking, and breakage of iron.

2. The published reports of the Directors, do not contain the whole cost of conveyance in the waggon department, though proved to exceed 73 per cent. of the income in the last six months of 1831. For example—engagements outstanding, and "extraordinaries," the latter including probably a magnificent warehouse at Manchester, which cost more than 20,000*l.* for the reception of goods passing along the line *gratis*.

3. The expenses on a railway are not *decreased* in proportion as the speed is *increased*, as estimated originally by Messrs. Stephenson and Locke, but multiplied six and seven times over, as proved at page 13.

4. The whole of the *fixed* expenses will bear most heavily in proportion as the traffic is less. For example, on the Manchester line, for only 30 miles of railway, including 60,000*l.* per annum for interest alone, besides the daily wages of 73 agents and clerks, and 648 engine-men, guards, and labourers, total 721; whilst the expenses of the whole would be after the rate of 42,782*l.* per annum, besides other items, exceeding after the rate of more than 12,000*l.* per annum, according to the six months ending 1831. It should be observed, also, that the carrying and waggon departments alone, exclusive of the coach department, employ 36 agents and clerks, and 231 engine-men, guards, and labourers, at a cost after the rate of 14,248*l.* per annum, whilst the coach department employs only 12 clerks and 63 engine-men, guards, and labourers, at a cost after the rate of 4,888*l.* per annum; yet the waggon department, as compared with the former, ton for ton, is full *six times less profitable*.

5. The number of passengers estimated for conveyance approximates more closely to the half year ending 1831, than to any other for the whole period. The Manchester Railway carried nearly 50,000 passengers during that period, for *nothing*, including workmen and others, the weight and carriage of whom did not lessen the cost of wear and tear: besides, before any new railway is constructed, the duty will be *doubled*, or the same as is now paid by stage coaches, unless the Government mean to benefit one class of the community at the expense of another.

6. The capital will be nearer one-half than one-third more.

7. The total income estimated will be one-half at least *less*, by competition with other methods of steam transport, 100 per cent. cheaper.

But to prevent the possibility of *cavil*, (for we know that even a *straw* will be caught at) we have reduced the actual basis for the Southampton line to 50 per cent. of the income in the waggon department; and for the Brighton line to 40 per cent.; giving the promoters of the latter the full benefit of only 44½ per cent. in the coach department, although the carriage on the Manchester line, to make the cost only the latter figures, was after the rate of 180,000 passengers more at least than the Brighton Railway is estimated to convey.

We see, however, no good reason why the same guide to expenses should not lead the Railway advocates to the other side of the account; so as to settle the profits upon a scale better suited to the local circumstances of each particular line. In the case of the Liverpool and Manchester Railway, even granting that the expenses were greater than on any other line, the profits must be incontestably greater; for as Manchester is the heart of a district, where cotton is manufactured to a prodigious extent, it is of infinite importance to get the raw material from Liverpool as cheap as they can, and to send it away as cheap as they can: and when to this is added the fact, that the whole country between the two places is a *coal* district, where fuel can be had for a mere song; and where too, the ground over which the road passes is of little or no value for agricultural purposes compared with all the other lines we have named; perhaps it will appear that such circumstances alone, present not only motives for making the road, but also means for continuing it, not to be found in any part of the kingdom, or in any quarter of the world in the same distance.

If, therefore, it can be shewn, that this, the most favourable line, has not from first to last paid back to the shareholders even four per cent. interest upon all money advanced, and must at no distant date stop paying the present dividends altogether, or borrow more money to a large amount, how can *other* lines *less* favourably placed

by nature and commerce, ever hope to make double, treble, and even five times greater profits! True it is, that a portion of the expenses incurred on the Manchester line will be avoided by *improved practice* in the art of constructing similar ways and works; but all that is saved one way by skill and experience, will be more than counter-balanced by the disadvantages of other lines.

The total amount of interest lost during the construction of the Manchester and Liverpool Railway, up to the 31st May, 1830, and not since paid back to the shareholders, is calculated to be not less than 95,000*l.* see Statement No. 1. Assuming therefore, this item to be 100,000*l.*; when the concern opened on the 16th September 1830, the additional interest to the 30th

June 1833, would make it, roundly speaking, about 113,958*l.*; and taking the whole capital expended at the same period to be 800,000*l.*, the interest thereon for two years nine months and a half, will be 111,666*l.*, making together 225,624*l.* due for common interest alone at 5 per cent.!

Yet the aggregate amount of gross profits divided during the whole of the above period, after discharging interest only upon all money borrowed is, according to the published reports about 179,260*l.*, being in fact, 1240*l.* less than four per cent. to the shareholders!

For the total expenses, receipts, and profits, of the Manchester and Liverpool Railway will be found to be nearly as under, up to the end of the last half year.

	Expenses.		Receipts.
	£	nett	£14,432
From 16 September to 31 December, 1830....			
1 January to 30 June, 1831.....	35,379	—	65,693
1 July. to 31 December	49,025	—	89,809
1 January to 30 June, 1832	47,770	—	74,706
1 July to 31 December, 1832	48,278	—	81,901
1 January to 30 June, 1833.....	52,900	—	86,071
	£233,352		£412,612
Total Profit.....	179,260		
	£412,612		

Mr. Grahame explains why this result has not been rendered quite clear on the face of the published accounts, by stating that, "the Railway Corporation," keep two separate accounts of expenditure, "Ordinary and Extraordinary." The "Ordinary Expenditure" is paid from the annual returns received from the Railway; and the "Extraordinary" is paid by borrowing money, or by a creation or sale of shares, which is termed, "adding to the capital account." The "Ordinary Expenditure" only affects the dividend; and it is the interest of every one concerned, to make that expenditure appear as *low* as possible, and whenever the outlays are commingled or doubtful, to throw the burden on the obnoxious shoulder. Total capital last sworn

to by the Treasurer in April, 1832, was 1,020,586*l.* Borrowed 227,000*l.*

These, however, are arguments rather respecting the principle than the details of the calculations; and it is to the last question, which has been so *mystified*, that we wish more particularly to draw the attention of shareholders and the public in general.

In the waggon department of the BIRMINGHAM RAILWAY, the whole weight estimated to be conveyed in one year, besides cattle, is not much more than 51,000 tons, whilst the total burthen conveyed was 213,063 tons on the Manchester line in the two half years given in Statement No. 2.—Yet the income from the Birmingham line is estimated to be nearly three

times as much in the same department, with probably two-thirds more engines to keep, and out of a traffic not one-tenth so great!

The whole quantity carried by the fly boats on the Birmingham line is represented to be 41,860, a distance of 149 miles, averaging about 3½d. per ton per mile, and the Directors estimate they shall monopolize the whole. The total charge on the Railway, to pay one farthing of interest, must be 4½d. per ton per mile, so that mile for mile the Canal is already 12 per cent. cheaper. But as the water carriers on the Manchester line dropped 30 per cent. the moment the Railway became competitors with them, the same parties on the Birmingham line will doubtless not prove less blind to their own interest; and long before the Railway is ready, such are the improvements now making in Canals, not only may the charge be expected to be many times *less* than the Railway; but the time now lost will be very considerably *saved*. Besides, the Manchester and Liverpool Railway has only been able to obtain one tenth of the water line traffic at the end of three years; and granting the Birmingham Railway secured five times as much, the income estimated at 92,820*l.* would be one-half; say 46,410*l.* The only chance therefore for the Railway in the waggon department, must be confined to goods requiring extraordinary expedition; and these comparatively are very few. For instance glass, is stated in evidence before Parliament to be only 1,050 tons annually; which, with the exception of a small portion of other goods for Germany and the North of Europe at particular seasons of the year, so as to avoid the ice in the Baltic, will be the only traffic principally wanting railway expedition.

Mr. William Shore admits, in his evidence, that the charge by canal from Birmingham to London, for heavy goods, including iron and coal, is only one penny per ton per mile; and for the lighter articles by fly boats not more than one penny

half-penny per ton per mile; so that after allowing for *extra* expenses, canal carriage is clearly already more than one hundred per cent. cheaper on the average for such goods, mile for mile, than the *bare cost* on the Manchester line of similar carriage the last half year in 1831.

That this is no imaginary picture, is proved by the fact, that out of 1,248,000 tons originally estimated to be conveyed between Manchester and Liverpool annually, the Railway has only carried, at most, in twelve months, 120,509 tons of the regular goods, (see Statement No. 2.) being scarcely one-tenth part of the whole traffic, notwithstanding the double attraction of ten to one in velocity, and still more in regularity. For the water line is nearly double the distance, and instead of possessing the regularity of even Canal conveyance, the traffic is, for 18 miles of the additional length, subject to the winds and tides of the Mersey. See Mr. Grahame's Letter to the Water Carriers on the Manchester line, who, with Messrs. Telford, Houston and Macneill, may be considered our leading authorities for all improvements in Canal Navigation.

The same Company professes to carry 41,600 oxen 80 miles at 3d. per ox per mile, that is 41,000*l.*, whereas one ox is now carried on the Grand Irish Canal, from Ballinasloe to Dublin, 96 English miles, at three-eighths of a farthing per mile; and as there is no reason why some of our Canals should not carry as cheap, this branch of the revenue is likely to be performed by others for nearly 100 per cent. less.

The next branch of the Revenue is much more reprehensible, because, if true, the credit of the Committee is absolutely at stake to undeceive the public. The Committee estimate to carry 364,000 sheep 80 miles, at one half-penny per head per mile, for 60,666*l.* 13*s.* 4*d.* But Mr. Grahame states that the Directors were aware, that a year *previously to swearing* to this branch of the Revenue in the Lords' Committee, the

Directors of the Liverpool Railway had endeavoured in vain to raise a revenue, by carrying sheep along a still more favourable line, at even *one farthing per mile each*; the butchers and graziers having declared their utter inability to pay it, and consequently preferred *driving their sheep*. The charge was therefore reduced to *one-fifth of a penny per sheep per mile*, or about one-third of the proposed charge by the Birmingham Railway. Yet even at this low rate, Mr. Booth, the Treasurer, swears, that "*very few sheep even now are carried.*"

Mr. Grahame then asks, "Have the Birmingham Directors seen this *proof*? Were they, or any of them, or their officers present when it was given on *oath*? and if so did they attempt even once to *undecieve* the Subscribers to the extent of 40,000*l.* per annum of their promised income? If they have not done this, let an official declaration be instantly made on the subject, in justice to those Share-holders who have already petitioned to have their names withdrawn from the Railway."

Thus have we another lamentable proof of the disregard manifested by gentlemen of high honour and respectability when once in office, to protect their own reputation, even in statements sent forth to the world, wearing the stamp of their own names, and known to be concocted by their own clerks. It is too much to infer, that the Committee of the Birmingham Railway meant absolutely to *deceive* the Public; and we are willing to believe quite the reverse. But then, are we driven to assume, that this trifle of FORTY THOUSAND PER ANNUM must have slipped into the estimate inadvertently; thence into the Press; and afterwards into the hands of the Public, unknown to the Committee themselves; only, if this be true, the Public may ask, why it was not *withdrawn* when discovered, instead of leaving it to go its round, as a kind of *catch-trap* for the avidity of capitalists, as well as the Legislature, during the progress of the Bill in Parliament?

For if the sum over-credited for sheep and goods by fly boats be deducted, the profit in this department will not be one farthing per cent. See Statement No. 2.

In the coach department, the delusion will be seen not less striking, when compared with the Manchester line. The total number of passengers carried by Stage Coaches between Manchester and Liverpool, before the Railway opened, was about 450 daily; whilst, for 21 months on the latter, they averaged 1,200 daily; but for the last six months only 1,098 daily, or little more than double the traffic of stage coaches. The gross profit by stage coaches will be found to average not less than 10 per cent. and this too founded on Railway Estimates. (See Statement No. 4. following Article.) But although nearly the whole of these coaches have ceased running against a competition equal to a saving of 50 per cent. in money and time, yet what is the result at the end of three years? The total expenditure has risen from 54 to 67 per cent. of the income in eighteen months:—a numerous and respectable class of the community have been deprived of bread—the government of nearly half their revenue—whilst, in fact, the Railway itself did not make, in the last six months, from passengers alone, even *half* the profit previously made by stage coaches.

Nor will half the profit of stage coaches continue much longer to be made on the Manchester line, unless Railway coaches and machinery should last for ever; and this too, mark, without the competition of a single steam carriage, or the quick boats now used on the Paisley Canal, both of which will run with passengers on the same line, long before another railway is constructed, many times cheaper.

Yet the Committee of the Birmingham line have a much higher conception of the capabilities of their coach department. For we cannot presume to assert that they are *wilfully blind* to these incontrovertible facts. Accordingly they estimate to carry

about 1,494 passengers daily or nearly 3 times the number conveyed by all the stage coaches now running between London and Birmingham; and above one-third more than the whole number which the Manchester and Liverpool Railway has been able to realize on a fair average for twelve months at the end of three years, after the *cholera*, one of the asserted causes of diminution, had nearly subsided.

Besides, whilst the Birmingham Railway is to carry passengers at *half* price, the Committee profess not to make much more than the *same* profit as is now made by stage coaches, that is about 10 per cent. (See Statement No. 4). And even this they cannot obtain without monopolizing the whole coach traffic, including posting, small parcels, bookings and portorage, leaving steam carriages and canals quite out of the question altogether. Yet should both become competitors with Railways on the same line, the latter is not likely to pay one per cent. profit.

For, unless it can be proved that the passenger traffic on the Birmingham line will be greater, it is evident that the profit must be less. But it has been already shewn that the profits of the most favourable line in the whole kingdom will be swallowed up eventually in the expenses, and it may be seen in Statement No. 2. that the present profit in the Coach Department is not more than after the rate of $4\frac{1}{2}$ per cent. per annum, consequently, it must be equally evident, that the same unfortunate termination will follow, only much quicker in proportion as the means of traffic are less.

Mr. Giles, for the SOUTHAMPTON LINE, estimates the total expenditure for the whole traffic at 111,000*l.* per annum; that is, about 10,240*l.* for the waggon department, and 100,760*l.* for the coach department; whilst, in fact, according to the *actual* cost on the Manchester line as per Statement No. 2. the first expense for goods will be 17,272*l.* and the latter for passengers 150,833*l.* making in all 168,105*l.*;

or 57,105*l.* more than the engineer on the Southampton line has calculated.

In the waggon department the total income is stated to be 34,544*l.* which at 4*d.* per ton per mile gives about 25,334 tons, yielding, in fact, more income than the Manchester line obtained from 73,884 tons; and this too, like all the other Railways, without crediting Canals with one farthing. But granting the full benefit of such a monopoly, the profit would not be more than $1\frac{1}{2}$ per cent.

In the coach department, the income is estimated to be more than $7\frac{1}{2}$ times the whole amount of similar traffic for the last six months on the Manchester line, (given in Statement No. 2.), and the profit is to be more than eight times greater. But a gentleman, formerly connected with some of the promoters of this line, (out of office) states, in the Herald of the 29th November last, that the Parliamentary notices would have been more accurate, had they mentioned that the line was to pass *under* Wimbledon Common, Chertsey, Basingstoke, and Winchester. But as no public conveyance ever travelled by that route to Southampton, it is asked, from what data the calculations for income have been derived? or, why the annual income has been increased to 105,692*l.* per annum, on the data of another Railway, to which there is not the slightest analogy, merely because the Birmingham line is distinguished by a similar figure of multiplication? The writer then adds, there have been six sets of Directors since 1830, besides two sets of Solicitors and Secretaries; and for what we know, the writer himself may be one of the *ex officio* authorities. But, from our own knowledge of the high qualifications of the present Secretary, should it be within the range of possibility to bring this Railway to London, it will be due more to his talents and exertions than to any proved means of adequate income.

On the BRISTOL LINE, the calculations for income seem to be concocted more with a view to present means than future profits:

for in the waggon department the total income is estimated to be 143,515*l.* exclusive of canal or sea-borne goods; and assuming the charge to be the same as on the Manchester line, for almost double the quantity, that is 4½*d.* per ton per mile, the total will be about 50,713 tons, being at least equal to all the goods, including 41,800 tons by canal, as estimated for the Birmingham line, although the former is well known to be a much less productive route.

But, it is not pretended, that even this traffic can be obtained without superseding every other interest, and bidding defiance to any velocity or economy equal to what is now so fully established on many of our canals; and notwithstanding there is one water line, (besides canals) by which goods may be brought to London from Bristol, at a freight equal to about one penny and one-eighth of a penny per ton per mile on the Railway, or nearly 400 per cent. cheaper than the latter, besides the fact already proved on the Manchester line, that owners of goods, not requiring dispatch, prefer the water line in the proportion of 10 to 1. But granting all the monopoly to be realized, the profit will not be greater in the waggon department than 1½ per cent. See Statement No. 2.

In the coach department, it is notorious, that there is at least one-third less travelling between London and Bristol, than between London and Birmingham; yet the Bristol Committee assert, that they shall carry 58,705 passengers in one year more than the Birmingham line, and 176,494 more than the Manchester line, including the most productive half year of the whole period, under the authority of a return said to be from the Stamp Office, only taking care not to produce it, as the Birmingham Committee have done. Nor are we without strong grounds for believing, that such a return never will be published, for the best of all reasons, because it never existed to such an extent.

But, granting the fact was proved, are

Steam Carriages and Canals not to carry any portion of the traffic, merely because they will both condescend to do it many times cheaper, long before the Railway opens? Is the Bristol line, like the Birmingham line, to monopolize all the traffic even against a saving of 50 per cent.? Yet, that saving must be sacrificed altogether, before the Bristol Railway can expect to realize nearly six times more income from passengers alone, than the most favorable line in the kingdom.

In the waggon department of the BRIGHTON LINE, Sir John Rennie's Committee estimate that they shall carry 154,534 tons of profitable weight annually, not included in the first calculation; to which may be added more than 300,000 tons of weight in machinery, waggons, &c., paying *nothing* to the shareholders, but increasing heavily the wear and tear of the vehicles as well as the road itself: whilst the charge for goods is not to be as promised in the previous Prospectus, *less than five pence per ton per mile*, but about 50 per cent. more than the first estimate. Mr. Vignoles calculates to carry only about 90,000 tons at three-pence per ton per mile, or 25 per cent. cheaper!

In the coach department, the Committee of Sir John Rennie first calculated that they should clear 125,000*l.* per annum, or fifteen per cent., by carrying passengers alone at eight shillings each, say (having no data to guide us) about 416,665, which, after deducting 25 per cent. as the ratio of the income on the Manchester line, instead of about 44½ per cent., leaves, exclusive of parcels, the profit as above stated. But the present estimate proposes only to carry 331,616 passengers at 10*s.* each, including fee to coachmen, being 85,049 passengers less than calculated a few weeks previously. Mr. Vignoles reckons to carry about 365,000 passengers annually.

The gross profit by Sir John Rennie's line, is now stated to be 15½ per cent., or only one half per cent. additional for carrying 85,049 passengers less; and 154,534

tons of goods, not included before. The Committee add 60 per cent. to the income of 122,427*l.* for expected increase of traffic, stated to be 73,014*l.*; whilst in fact, had any one checked this calculation before it was published, it would have been proved *minus* 442*l.*!

But this is not the only error. For the shareholders are led to believe, that the cost on the basis of the Manchester line expenditure, is 52,000*l.*; whilst in fact, at 44½ of the income, it is 78,353*l.*, being 26,353*l.*, short debited, thereby reducing the gross profit from 15½ to about 11½ per cent., and Mr. Vignoles makes the profit of the English line about 10 per cent. See Statement No. 2.

But granting to the full extent all the profit exhibited by both engineers, it can only be obtained so long as steam vans and coaches are not running on the turnpike roads. For the moment elementary power is brought into use by such vehicles, and half the common road be, in effect, turned into a railway of stone instead of iron, like the one now proposed to be made by Sir Henry Parnell, Messrs. Telford, Macneill, and others from London to Holyhead, it is perhaps not asserting too much to say, that the iron railway to Brighton is not likely to pay much more than one per cent.

The errors we have noticed in the Revenue Estimate for Sir John Rennie's line, furnish only another proof of the facility with which Railway Committees are *blind-folded* by their own servants; and this too not for want of talent or sound commercial knowledge in Committees; but owing solely to want of time from other more important engagements: for that such blindness is not wilful, is guaranteed by the integrity and station in society of those whose names are used to catch the eye of monied men. Yet, are we quite unable to explain why any enlightened body should be driven in this *small* metropolis to select clerks, not even able to cast accounts, so as to see that two and two make four,

without exposing their employers to the charge of miscalculation.

Little can be said as to Revenue for the *WINDSOR LINE*, as the promoters have wisely taken care not to reveal any thing in their estimate likely to lead to a detection of error. For neither the quantity of goods nor the number of passengers are disclosed, but the whole income is commingled in one round sum of 58,000*l.*; balance in favour of the company 25,000*l.*, or 8½ per cent, but debiting about 23 per cent. short of the actual expenses on the Manchester line! In justice, however, to the Committee, it should be stated, that they have exhibited a much nearer approximation to the scale of profit on the Manchester line, than appears in any one of the other estimates before the public; and doubtless, have spared no pains consistent with *other* engagements, to be quite accurate in the data upon which the profit they have shewn is founded.

It should be observed also, that the Directors of the Windsor line, like those of the Manchester line, were under the same delusion as to the use of horse power; for the Treasurer of the former says, that although the first line was laid out in 1824, and the second in 1825, it was not till 1828 that they decided whether elementary power should be employed.

Other Railway Companies are getting up, one from SWANSEA TO LONDON, THROUGH GLOUCESTER; another from the MIDLAND COUNTIES; and probably the whole 3,000 miles will be attempted. To shew for example, how utterly fallacious the line from South Wales must prove, every one knows, that the main object is to bring up *coal* and *iron cheaper* than it can be brought by sea. Now, the freight from Wales, varies from *ten to twelve shillings per ton*. The distance from Merthyr, where the most extensive Iron Works are carried on, is about 175 miles. The charge for carrying goods on the Manchester line, to pay scarcely *two* per cent. on the capital, see Statement, No. 2, is

four-pence farthing per ton per mile, for the half year, ending the 31st December, 1831; consequently, the charge for carriage alone upon one ton of pig iron, or one ton of coal delivered by Railway to London, would be about *three pounds one shilling and eleven-pence three-farthings per ton* for the whole distance; thus adding at least 100 per cent to the first cost of the former, and not less than 1,000 per cent to the latter. The only question therefore is, can the inhabitants of London afford to pay such a price, merely to save the cost of keeping heavy stocks in the market, owing to the irregularity of water conveyance?

Granting, however, that rail-roads never will be carried into effect, still iron masters have nothing to regret, seeing that three-fourths of the whole capital sunk in their construction is not in iron, but in *labour*; surely then, it may not be unwise to re-consider the policy of supporting what is not profitable, and must, in the end, prove discreditable to themselves, instead of encouraging the two-fold form of *Iron Boats* and *Steam Carriages*, which will doubtless lead to a much greater consumption of their own commodity. For with a waterline 3,000 miles in length, ready for the general use of *Iron Boats*; and with more than nine times as great a length of common roads for *Steam Carriages*, equally ready for use, none of us can say how soon we may not see even our *wooden*

walls changed for *iron*, and our horses in stage coaches for steam engines; whilst the raw material will be brought to market, from the mountains in Wales, by one method or other of *Steam Transport*, 100 per cent. cheaper than rail-roads ever can convey it.*

But, granting that all the Railways, in despite of truth and common sense, should be carried into effect, what is to become of those from the West when they reach the London end of their respective lines? Do the shareholders understand that they must borrow, besides all other sums proved to be wanting, a large capital to bring the goods to the consignees at the East end of the metropolis? For ships cannot get to them; barges will be too dear with extra lines to reach some of them; cabs almost too expensive, even should the inhabitants be able to spare time enough to ride after the Locomotives in them; instead of starting in *other kind* of *Steam Carriages* from *the very heart of the city*.

Nor is this all; for should the contemplated improvements be made and realized to the fullest possible extent, even to saving one half of the whole cost for levelling, still, would *Iron Railways* be quite unable to compete with other methods of *Steam Transport*, rapidly getting nearer and nearer to perfection, as the latter, in the end, must prove many times cheaper and equally expeditious for passengers.

ESTIMATES FOR CONSTRUCTION.

But having distinctly proved in all the Railway Estimates for *Revenue* now before the public, the two-fold error of omission and commission, it remains only to prove specifically, and still more conspicuously, that the whole of the estimates for *con-*

struction are not less reprehensible or vulnerable.

The BIRMINGHAM estimate was first £1,500,000, then £2,000,000; afterwards £3,000,000, for a double line, that is eight single lines of iron railway. The last change in the capital was £2,500,000; and the length is now said to be 115 instead of 112½ miles, the engineer having disco-

* In the First Number of the Quarterly Journal, this subject will be fully exhibited under a general Review of the Iron Trade, past and present.

vered the means of doing *half* the whole work, that is, for a single line, nearly three miles further round, for only *one-sixth* less than his previous estimate for a double line. Yet, there are those who publicly stake their critical accuracy on the fact that the whole four estimates together will not be much more than enough for the first proposition; whilst four, if not five, engineers have added another million sterling to the last estimate.

For the BRISTOL LINE, the capital was first stated to be 2,805,230*l.* then 3,000,000*l.* cost of construction for this line is 1,887,960*l.* less than it would have been had the estimate been framed, mile for mile, the same as the Manchester one. See Statement No 1.

Yet, there must be two acts of Parliament for the Bristol line—two lists of dissentients—six committees,—two out, and two in both Houses of Parliament—two law bills—two parliamentary bills—two bills for levels and sections—and two bills for engineering. Although, only one set of the last cost the Manchester Railway Company 50,000*l.* for 90 miles less distance; whilst the opposition alone to the Bill cost thirty or forty thousand pounds more. The Birmingham Railway Company we know paid 50,000*l.* for *losing* only one Act of Parliament, so that what the Bristol railway Share-holders may have to pay for *gaining* two similar Acts of Parliament, it is quite impossible to calculate.

The Committee of the Bristol line state that the locomotives will, in no part of the line have to surmount an inclination greater than 1 in 340, or 15 feet in a mile; and for the first 50 miles out of London, none greater than 1 in 528, or 10 feet in a mile; asserting that this approach to a level must render the locomotive engines "*much more effective*" and subject them to "*less wear and tear*," than they are exposed to on the Liverpool and Manchester Railway, part of which line has an inclination equal to 1 in 98, or 53 feet in a mile.

But, why were capitalists not told that instead of locomotives being "*more effective*," and the "*wear and tear less*," on the Bristol line, as compared with the Manchester line, it must be greater. For "the road upon the whole between Manchester and Liverpool is so level," says one account of the Railway by Mr. T. T. Bury, page 2. "that, with the exception of two inclined planes at Rainhill, there is no greater inclination than in the ratio of about one in 880; or six feet in a mile: so that at the Liverpool end, it is only 46 feet higher than at Manchester.*

If, therefore, the expense of "*wear and tear*" is to be *less*, because the greatest inclination in the first 50 miles on the Bristol line, is nearly *twice* as sharp, and the highest elevation is the next 70 miles much more than twice as sharp as any on the Manchester line, we can only add, it is *not* according to the creed of some of our most enlightened engineers, even if the engines were not to travel annually *six or seven thousand miles further*.

But, we shall now proceed to show some grounds for believing that neither the Birmingham nor the Bristol lines can ever be executed, without borrowing a very large additional capital, especially, should proper reservations be made, contingent upon the possibility of *four* lines being ultimately inevitable.

It should, however, be borne in mind that although we have drawn up Statement No. 1, exhibiting the *cost of construction*, mile per mile with the Manchester line, we are not so foolish as to insist that each particular item should be the same; only we know no better way generally to bring about a *right* understanding of the whole case.

Land.—On the BIRMINGHAM and BRIS-

* But as Manchester is nearly on a level with the sea at Liverpool, it seems an extraordinary piece of engineering to have carried the railway to a point forty-six feet above that level at Liverpool. All the sea-borne goods going to Manchester have first to be raised to that level, and all going from Manchester to Liverpool must experience the same obstacle.

rol lines the cost for surface must be much greater mile for mile with the Manchester line, and other reasons are assigned for this under the head of "*Earth-work*." For the land along the latter is principally of little value, compared with the major part of both the former lines, including a long line of some of the finest land in England, having *increased* value given to it, by *anticipated* facilities from railway conveyance. Nor are these facilities likely to be less highly rated *since*, than *before*, any similar communication existed. For the owners now see that "veins of water will be cut, springs dried up, and many of the sloping fields along the lines so deprived of water that they will become sterile and unfit for pasturage; or the stock driven to a distance for a supply, greatly to its own injury, and with much additional cost."

Besides, "whole estates and fields will be torn asunder by immense gashes and mounds, over and under which expensive bridges and long and wide tunnels must be constructed, or the value of the land will be still more deteriorated."

So convinced are the land-owners that their estates are threatened with destruction, that the nobility and gentry in Berkshire and Buckinghamshire only recently held a public meeting, at which the Marquis of Chandos presided, when it was unanimously resolved, that Railways were wholly unnecessary—not wanted—and the Representatives were instructed accordingly to oppose all the Bills for the Western Railways in Parliament.

But granting that the Bristol and Birmingham lines are forced into execution, the quantity of land will prove greatly *underrated*. Mr. Walker states in his evidence, that the Leeds and Selby Railway Company have by his advice purchased land sufficient for a *double* line eventually: and the Stockton and Darlington Railway Company have been equally wise in their arrangements.

Mr. Cubitt agrees with Mr. Walker, that

land should be purchased for four lines; because the greater the length of line, the greater the necessity for it; and the Manchester and Liverpool Railway Company prove this by constantly increasing and carrying on enormous embankments.

Mr. Walker estimates that the additional quantity of land for the Birmingham Railway would increase the cost 60,000*l.*; and Mr. Gravatt estimates the land for the latter to be not 1,250 acres, as calculated, but 1,749 acres, exclusive of depôts, stations and bridges; whilst the land for the Bristol line may prove in the end equally deficient. Yet the cost for surface on the Birmingham and Bristol lines, mile for mile with the Manchester line, is estimated to be 193,255*l.* or full 24½ per cent. less!

Note.—All the surveyors *against* the Bill estimate the land at 63,000*l.* *more* than those *for* the Bill; and including the sum estimated for four lines, the *extra* cost will be 123,000*l.* for one of the lines only, that is, provided the owners themselves do not shew ground for a still higher valuation.

Bridges.—On the Birmingham line alone there will be, according to Mr. Stephenson, jun. 404, but by all the engineers for the Petitioners, 466 bridges, including 29 overrivers and canals, and *four over the Thames*; whilst the Manchester line has only five over inferior waters; one of which alone, the Sankey Viaduct, cost 50,000*l.* The rest, that is 437, are over roads; whilst the Manchester line has only 58, and many of them neither so wide nor so long as those will be for the other lines mentioned. Besides which, the expense for masonry and carriage of materials will be much greater. The number of bridges are not given for the Bristol line, but they are not likely to be less numerous; and the culverts for both lines at least 500. Yet the whole cost, mile per mile with the Manchester line is estimated to be 25,091*l.* less!

Note.—Mr. Macneill estimates the

bridges at 104,410*l.* more than Mr. Stephenson, jun.

Earth-work.—On the Birmingham and Bristol lines, the substratum being soft and slippery, the embankments will require to be considerably more than Mr. Stephenson has estimated, at least, in the opinion of four engineers named in our concluding case; whilst much of the sloping to the cuttings will require three in the base to one perpendicular.

It is true that Mr. Stephenson, jun. did not originally estimate his slopes to be so great; calculating all the embankments 2 for 1; and for the cuttings, varying from $\frac{3}{4}$, 1, $1\frac{1}{2}$, and 2 to 1 in the London clay. Owing, however, to the necessity for adopting the *black* instead of the *red* line section, he has since been forced to *increase* both.

All the engineers against the Bill agree, that no embankment in London Clay will stand at less than 3 to 1; at Primrose Hill, indifferently, at 4 to 1; Grand Junction Canal, at Wormwood Scrubs, 3 to 1; Barnet, now slipping, at 3 to 1; Brent Embankment, 3 to 1. The slopes to the cuttings at Ridge Hill, between Colney and South Mimms, are slipping at 3 to 1 and 4 to 1; at Paddington Canal they will not stand at less than $2\frac{1}{2}$ to 1, and 3 to 1.

The total quantity of *earth-work*, or cuttings on the Manchester line was 3,405,000 cubic yards, or 113,500 cubic yards per mile. The Great Roby Embankment, which carries the railway across a valley of that name, about two miles, varies in height from 15 to 45 feet, and in breadth at the base from 60 to 135 feet. The largest cutting in stone is 70 feet deep through the solid rock of Olive Mount, nearly the same distance, whilst, from the Kenyon excavation alone, 800,000 cubic yards of sand and clay were not only dug out, but *carried away* to form the neighbouring embankments.

The total quantity of *cuttings* and embankings for the Birmingham line, according to Mr. Walker, is not less than

29,237,820 cubic yards; and as the cuttings alone are 18,488,265 cubic yards, or 160,767 cubic yards per mile, the latter proves to be 47,267 cubic yards *more* cutting mile per mile, than on the Manchester line, or 6,803,265 cubic yards *more* than Mr. Stephenson, jun. has estimated. On the Bristol line the earth-work is not given, or the *excess* quantity mile for mile with the Manchester line might prove equally extraordinary. The total cost of this item, by Mr. Walker, for the Birmingham line alone is 1,119,163*l.* or 340,163*l.* *more* than Mr. Stephenson, jun.; and if to this be added the earth-work for the Bristol line, the total cost for both lines (merely for leveling) will be very near the aggregate amount, mile for mile, with the Manchester line, in Statement No. 1. Yet, strange to say, the Railway estimates for both these lines mile for mile with the latter are 402,991*l.* or full $22\frac{1}{2}$ per cent. less!

But to shew how little dependance is to be placed on calculations respecting earth-work, it should be remembered, that the original estimate for the embankment at the London end of Barnet, though only a mole-hill compared with railway embankments, was 4,000*l.*; yet the actual cost paid was 14,000*l.*, or more than treble; whilst the excavations for the Highgate Archway, which were estimated at 30,000*l.*, actually cost nearly four times that sum.

In speaking of "*cuttings and embankings*" on the Birmingham line "Investigator" (probably one of our ablest engineers) observes, p. 81, "that they would occupy a greater breadth, arising from the nature of the soil. There is scarcely a mile of the line that any 'eminent engineer' would expect to stand, at a less slope than two of base to one of perpendicular; and there is evidence, that the London clay, the chalk, the plastic clay, the Oxford clay, and the oolite, which occupy full 70 miles of the line, must have a slope of two and a half base to one perpendicular; otherwise, there must be continued danger of slipping in the exca-

ventions, and especially the embankments. The remaining 30 miles pass over the lias formation, and every one who knows any thing about geologic structures knows, that the surface of that formation is flat; consequently, the railway will, or at least should, be carried in a level across the whole of that formation. It is therefore evident, that the '*deep cuttings and embankings*' must be wholly through the soft strata, the clays and the oolite; and that the slopes there must have the breadth as before stated."

Tunnelling.—On the Birmingham line there will be ten tunnels, measuring about 7,876 yards. The number of tunnels for the Bristol line are not given; although we know, that only one tunnel on the Manchester line is estimated to cost 130,000*l.*; yet the expense mile for mile with the latter is stated for the Birmingham and Bristol lines to be 868,303*l.*, or full 63½ per cent. less!

N.B.—Mr. Macneill estimates the tunnelling for the Birmingham line at 101,164*l.* more than Mr. Stephenson, jun.

Ballasting, Blocks and Rails.—The iron for the rails on the Birmingham and Bristol lines is to be half as heavy again; and as compared with the Manchester line, according to the present price of iron, considerably dearer. Every part of the Manchester line is near coal, iron, stone, and every requisite for the Road; whereas no iron is made along either of the other two lines; nor is there any coal except at a great distance, or a single foot of stone fit for blocks within many miles of the Birmingham line; though the Bristol line in the latter respect is better provided; so that the inland carriage alone will be no trifling addition to the cost,—one-fifth, at least, besides other considerations; yet the expense, mile for mile with the Manchester line, is estimated to be 150,183*l.*, or full 12½ per cent. less!

Note. Mr. Macneill estimates this item, for the Birmingham line, at 135,466*l.* more than Mr. Stephenson, jun.

Drainage.—Mr. Macneill estimates this item, for the Birmingham line, at 50,220*l.* But we do not find it noticed at all in either of the estimates for the Birmingham or Bristol lines.

Fencing.—The cost for fencing on the Birmingham line is estimated to be 76,032*l.*; yet, in the Bristol estimate, this item is not even named.

Note. Mr. Macneill estimates the fencing for the Birmingham line at 40,843*l.* more than Mr. Stephenson, jun.

Stations, Depôts and Warehouses.—The Birmingham traffic is greater than that for the Bristol line; yet the cost for the former is estimated to be £231,400 less than the latter; whilst the expense for both lines, mile for mile with the Manchester line, is estimated to be £279,300, or full 50½ per cent. less!

Note.—Since making up Statement No. 1, we find that Mr. Booth asserts, in his evidence before Parliament, that this item cost 200,000*l.* and not 70,228*l.* as given in his own account 31st May, 1830. This will increase the expense per mile to 6,666*l.*, and make the aggregate cost mile per mile of the Birmingham and Bristol lines equal to 1,566,510*l.* being 1,295,910*l.* more than the estimates for those lines; and consequently it will diminish the item for contingencies exactly in the like ratio, leaving the general result the same. It is not however presumed, that any fair comparison can be made as regards either of these items, mile for mile with the Manchester line, particularly "contingencies," as doubtless, the outlays for other items are included; still, enough is shewn to justify a suspicion at least, that the estimates for the Bristol and Birmingham lines are *minus* to a considerable amount.

Engines, Coaches, &c.—The number of passengers expected to be carried on the Birmingham and Bristol Railway united, appears to be about 1,149,767 or nearly treble the number ever yet carried, in the most productive year, on the Manchester line; yet the cost of the *former* is esti-

mated to be, mile per mile, 269,165*l.*, or full 65½ per cent. less!

Interest.—The interest sunk on the outlay, during construction, is *omitted* altogether in all the railway estimates, making those for Birmingham and Bristol lines, mile for mile with the Manchester line, 783,255*l.* less!

Contingencies.—The Capital of the Birmingham and Bristol lines, united, is stated to be, according to Mr. Macneill and other engineers for the former, nearly 5½ times greater than the Manchester line; yet the sum allowed for contingencies, mile per mile with the latter, is estimated to be 1,099,712*l.*, or full 58½ per cent. less!!!

Thus making, in the aggregate, a total saving of 4,071,255*l.* in only 235 miles; a sum so enormous, that no man, with ordinary pretensions to *credulity* for Railway speculation, will be found to give credence to it.

But granting that such enormous savings, exceeding *four millions* sterling, can be made, that is more than the whole estimated cost of four railways from London to Southampton, still have the public ample grounds for withholding their investments, seeing how little dependance is to be placed on the random calculations of some of our "most eminent" engineers.

For the SOUTHAMPTON LINE the capital is stated to be 1,000,000*l.* or 2,136,441*l.* sterling less mile per mile than the Manchester line, the difference being enough per estimate, to make two whole Railways from London to Southampton, in length 154 miles!

It is true, that with regard to the Southampton line, the first 50 miles out of London may not be more expensive to construct than the Manchester line; but beyond Basingstoke, the cost mile per mile, in many of the items, is likely to be much heavier. For, on this line there is one tunnel between two and three thousand yards long, with 84 feet of deep cutting at one end, and 77 feet at the other; in fact, both longer and more ex-

tensive in depth of cutting than the great tunnel on the Manchester line (2,243 yards) where the miners refused to proceed; and frequently the engineer himself was unable to keep them at their posts, so great was the dread of being buried alive, even in the field of their daily bread; the land also must be greater in quantity and value; bridges more numerous and costly—one, if not two, over the Thames; earth-work, many million cubic yards greater; iron rails, more in quantity, weight, and price; whilst the interest alone, during construction, will not be much less than 150,000*l.*

To prove that the most respectable engineers are not always infallible, Mr. Giles, engineer for the Southampton line, stated in his evidence before Parliament, that the total amount of deep cuttings to make the road level on the Manchester line, would not be less than 4,545,000 cubic yards; whilst in fact, the Treasurer proved after the work was executed, that the total quantity did not measure more than 3,405,000 cubic yards, being just 1,140,000 cubic yards less than estimated by Mr. Giles.

It is in evidence also by the same authority, that the cost of the whole of these cuttings and embankings would not be less than 270,000*l.*, whilst in fact, the Treasurer proved, after the work was completed, that the whole expense was about 199,763*l.* thus proving a second error, equal to 70,237*l.* Nor was this all; for the same gentleman asserted, that no engineer in his senses would ever think of making a Railway through Chat Moss on the Manchester line—a vast bog, covering an area of twelve square miles—having no doubt the cost would not be less than 200,000*l.*; whilst in fact, Mr. Stephenson, sen. did make a Railway through this Bog, five miles and a half long, without losing, as far as we know, any one of his senses. But instead of the expense being 200,000*l.* it stands roundly in the Treasurer's account only 27,719*l.*; thus

proving the third error to be equal to 172,281*l.* and also, that one of our most eminent engineers was *out* altogether in the two items of "earth-work" and "Chat Moss" for the Manchester line, not less than 242,518*l.* sterling.

For the Windsor line, the capital is estimated to be 300,000*l.* or 514,660*l.* mile per mile less than the Manchester line. It may be quite sufficient to state, in addition to some of the reasons already assigned for other Railways, that the land alone is not unlikely to cost one-third, at least, of the whole amount estimated.

The Directors undoubtedly feel quite convinced that the Southampton and Bristol lines *never will be executed*, or they would hardly have laid down a third line only a few hundred yards apart, thereby exposing the Windsor 'fair one' to the danger of falling into the arms of one or other of her rivals; so that the shareholders never could expect to obtain a single favour. But like a ship foundering between Scylla and Charybdis, she would leave only the "wreck behind."

For the Brighton line, there are two plans, one by Sir John Rennie, the other by Mr. Vignoles, both engineers of well known eminence. But as two lines, to bring Paris within fourteen or fifteen hours of London, *via* Shoreham and Brighton, can never pay two sets of shareholders, we presume the best line alone will be adopted; and the sooner the problem is solved, the better for all parties, except solicitors, engineers, and surveyors.

With regard to the total cost, both engineers are likely to find it considerably nearer, mile for mile, that of the Manchester line, than what they estimate. Yet, Sir

John Rennie states the whole expense of his line to be 920,000*l.* and Mr. Vignoles, 1,000,000*l.* sterling; the former being 1064,451*l.* less than the Manchester line, and 80,000*l.* under Mr. Vignoles, though it must be self-evident, that the line by Sir John Rennie, is by far the most costly. For Mr. Vignoles admits, that the land alone, to get over the first few miles from London, will cost 200,000*l.*, whilst the Bridges over and under roads, and across waters, on Sir John Rennie's line, will be nearly three times more numerous than on the Manchester line.

We have carefully examined both plans at the office of the Clerk of the Peace; and no one can take equal pains to be correct, without being struck with the marked superiority of the line laid down by Mr. Vignoles. The following facts may justify that assertion.

It is admitted in the prospectus, though not in the copy of the section given, that the greatest inclination from a level on the line by Sir John Rennie was 1 in 200, or 26½ feet in a mile; but the Committee, following the example of the Bristol line promoters, add, that this rise is only for one mile and a half, so that the public may run away with the notion that all the rest is equal to an iron bowling green.

The *reverse*, however, is the fact; and although we do not presume to assert that Sir John Rennie may not differ with the following gradients, when compared with any fresh calculations; yet are we disposed to believe, that he will not alter *very materially* the actual results, so that all parties interested may see at least more clearly *with*, than *without* these figures, how both cases really stand.

TABLE shewing the gradients of the London, Brighton, and Shoreham Railways, proposed by Sir John Rennie and Mr. Vignoles—the former commencing on the east side of Kennington Common—the latter a mile further into London, at the

Elephant and Castle; the first terminating a mile short of the sea at the Brighton end, and the last at Shoreham Light-house.—The following Table is an exact copy of Sir John Rennie's own section.

SIR JOHN RENNIE.

RISE.			
Miles.	Chains.	Inches Feet. per yard.	Feet Yards. per mile.
4...	22½	82...1 in	275...19½
1...	43	5...1	1623... 3½
8...	18	168...1	258...20½
1...	41½	Level or horizontal line.	
2...	54	18...1 in	785... 6½
3...	4½	50...1	322...16½
0...	50	2...1	1650... 3½
2...	7	4...1	2755... 1½
2...	34	46...1	278...19
1...	19	Level or horizontal line.	
28	375		

FALL.

Miles.	Chains.	Inches Feet. per yard.	Feet Yards. per mile.
4...	60	84 ...1 in	298...17½
2...	56½	8 ...1	1786... 2½
0...	56	80 ...1	310...17
2...	20	48 ...1	247...21½
4...	33	90 ...1	259...20½

SHOREHAM.

2...	0½	43½...1 in	243...21½
0...	46	6½...1	467...11½
2...	39	30 ...1	437...12
0...	75½	Level or horizontal line.	
24	390		

MR. VIGNOLES.

RISE.			
Miles.	Chains.	Inches Feet. per yard.	Feet Yards. per mile.
0...43 ...	30...1 in	95...55½	
0...20 ...	3...1 —	440...12	
0...60½	40...1 —	99...53½	
0...21 ...	3...1 —	462...11½	
1...19 ...	66...1 —	99...53½	
9...59½	132...1 —	390...13½	
6...47½	105...1 —	331...15½	
379			
SHOREHAM			
3...64 ...	44...1 in	456...11½	
0...78	Level or horizontal line.		
24			

FALL.

Miles.	Chains.	Inches Feet. per yard.	Feet Yards. per mile.
1...	56½	Level or horizontal line.	
3...	1	40...1 in	398...13½
5...	58½	91...1	332...15½
4...	19½	68...1	329...16
0...	59½	38...1	103...51½
0...	41	10...1	270...19½
0...	78½	50...1	103...51½
1...	2	15...1	361...14½
0...	77½	53...1	96...55
1...	65½	28...1	343...15½
9...	14	Level or horizontal line.	
29	393		

SUMMARY.

SIR JOHN RENNIE.

	Miles.
Distance from London to Brighton	46½
Ditto from Brighton to Shoreham	6
Total	52½

MR. VIGNOLES.

	Miles.
Distance from London to Shoreham,	
the port for embarkation to France	49½
Distance from Shoreham to Brighton	4½
Total	54

SUMMARY—Continued.

SIR JOHN RENNIE.

Total rise from Shoreham to Brighton, in six miles, 80 feet.

Total fall from London to Shoreham, 15 feet.

Total level along the whole line *less* than 4 miles.

Total length of one incline, rising $26\frac{1}{2}$ feet in a mile, over which the locomotive engines will require supernumerary aid, is one mile and a half.

Total number of miles over which locomotive engines will not be able to carry much above half a load, the ascent rising in various lengths from $16\frac{1}{2}$ to $21\frac{1}{2}$ feet in a mile, is 36 miles.

Six tunnels, measuring about 8,800 yards in length, or about 900 yards more than all the ten tunnels on the Birmingham line, estimated by Mr. Macneill to cost 351,450*l*.

The deepest cutting in the tunnelling is not less than 100 feet, and this too for a considerable distance.

The deepest *hollow* to *fill up* is not less than 70 feet,* and this too for a considerable distance. For example—near the fir plantation at Pilsty, close to the fourth tunnel: and other parts along the line, are both long and deep.

* *Ob.*—The luxury of being canted over such a height as 70 feet by some sudden *jerk* in the Railway, can only be appreciated by those who met with a similar *jerk* on the Manchester line, including engines, carriages and all, over a precipice not near so steep, though miraculously without any fatal consequences; yet to produce the latter, only the smallest stray implement is sufficient, should the watchman be off his guard.

We are at a loss therefore to conceive how passengers are to be conveyed, as Sir John Rennie estimates, at 23 miles an hour, or about one-third faster than the Manchester Railway, although the latter has now devoted more than three years in *vain* to all kinds of experiments for the purpose of increasing the speed beyond 17 miles an hour, over ground which, with the ex-

MR. VIGNOLES.

Total rise from Shoreham to Brighton, in $4\frac{1}{2}$ miles, 44 feet.

Total fall from London to Shoreham, 14 feet.

Total level along the whole line nearly 12 miles.

Total length of six inclines, rising on the average about 53 feet in a mile, over which the locomotive engines will require supernumerary aid, is five miles and a quarter.

Total number of miles rising on the average five feet in a mile, less sharp than the average of $16\frac{1}{2}$ to $21\frac{1}{2}$ feet in a mile, is 36 miles.

Three tunnels measuring about 6,300 yards in length, and requiring about 31 shafts for ventilation and light.

The deepest cutting in the tunnelling is not much more than 60 feet, whilst the average length and height of the whole, in other parts, is considerably less.

The deepest *hollow* to fill up is nothing like 70 feet, whilst the average depth and length of the whole in other parts, is still less, as compared with that on Sir John Rennie's line.

ception of the two inclined planes, is *not half so sharp* as any one of the *thirty-six* miles that may be selected from the gradient we have furnished for Sir John Rennie's line.

Besides, locomotive engines, tenders, fuel, water, and attendance, do not weigh on the average, as before stated, *less* than 12 tons; and it is easy to demonstrate, that

over *two-thirds* of Sir John Rennie's line a 20 horse locomotive engine cannot attain a greater speed than 15 miles per hour with only 14 tons in addition to the engine and tender; and that the *slightest* ascent for want of full steam on the steep gradients of 20 feet in the mile, which in one part are shewn to be for eight miles and a quarter, and in another nearly as much for *eighteen* miles, including four parts of the line, the engines must, over such inclines, soon be brought to a slow rate of travelling; because from the counteracting force of gravity the *impetus* will be soon lost. Therefore, practically, the difference in time and expense on the line of Sir John Rennie, will be as three to two; and if to this be added the difference of interest on *extra* capital sunk in the construction of such a line, the expense is likely to be much more.

But granting these obstacles did not exist, still, according to Mr. Cubitt, in his evidence before Parliament, other interferences with rapid travelling on a *single line* of railway are to be provided against. For where *quick* vehicles and *slow* vehicles are running on the same line, delays and interruptions must arise, increasing more and more as the line exceeds a length of *twenty miles*. Already have the directors of the Manchester line experienced much difficulty from precisely the same causes; so much so, that Mr. Walker states, that the Leeds and Selby Railway, by his advice, and Stockton and Darlington Railways, have also determined to secure land enough for a double line when wanted.

Neither will the power required to propel the engine over these sublime heights, on the Brighton line, be one atom less by moving along inclined planes. For, what is gained in diminished *height* on the latter, is lost in greater *length* of transit.

But it may be said, in support of a speed of 23 miles per hour, that although time will be lost in ascending the inclines, it will be gained in descending.

It is not so, however, as regards *steam power* on rails. For the same engine which is required to climb the ascent, is also required to bring goods or passengers down it; and in both cases power is *lost*; for in going up the incline, the power is 21 times greater than what is wanted on the level; whilst Steam Carriages on common roads have only to exert *twice* the power they carry to climb over the same ascent; so that as regards the former, the effect would be similar to that of a man, who, knowing that he would want a boat to pass a distant river, is compelled to carry it on his back till he comes to it.

"It is" says Mr. Gurney, page 10, in his Observations on Steam Carriages:—"this enormous difference in the tractive force necessary to propel a given weight up an inclined plane, on a rail road, which is so sensibly felt on the slightest elevation, and which renders the ascent of heavy engines impossible upon one of comparative moderate rise, especially with any load behind them." This is the principle circumstance which has deceived the scientific men, who write reviews, and treatises in their closets, when they have carried their speculations into the subject of Steam Carriages on common roads.

Besides, on common roads, the power may be varied at every hill by the use of a spare engine, or even a horse; so that the Steam Carriage would not have to carry the "Boat on its back," but may leave it on the bank of the river, and use it only when it wants it.

To avoid, therefore, this dilemma on rail-roads, it has been shewn, that Shareholders have to pay most dearly in the shape of "Earth-work," rather than carry the "Boat" on the back of their engines. For the total cost on the Birmingham and Bristol lines alone, in the single item of levelling, mile per mile with the Manchester line, is not less than 1,782,005*l.* sterling. See Statement No. 1.

Thus, it seems, that many times more than all the advantage arising from the

greater power of the locomotive engine is *lost*, by the greater expense of construction, and repairs of the rail-road itself. Hence, the fallacy of all estimates for railways, by those engaged in the execution, looking more to the *receipts* than to the *expenditure*.

But it will be said, that a substitute for the "*Boat*" may be had in stationary engines, employed to draw the locomotives *up* inclined planes on rails. Experience, however, has proved, that although stationary engines look very well on paper, yet in practice they are sometimes worse than useless—destructive to life or limb. For

after the most eminent engineers had fixed their engines on the Manchester line, like "Pelion upon Ossa towering over the adjacent land," with houses to hold them, and all other necessary buildings; it was found, much to the astonishment of the engineer, that the ropes or chains used to haul up the trains, sometimes *snap*, and plunge the unlucky passenger into eternity at once, or else render him a cripple for life. Such calamities have not unfrequently happened in some parts of the kingdom, where similar machinery is used.

RAIL-ROAD IMPOSITIONS DETECTED.

We have more than once adverted to the impositions and mystification to which the public are exposed, from the conduct of persons bearing influential names, but unfortunately placed at the head of Railway speculations. Nor can we give a better proof of the justice of our assertions, than by the following plain statement, from which it will appear, that with a view to deceive the petitioners, and to entrap capitalists, certain documents have been put forth in support of Railway bubbles, whilst every thing likely to open the eyes of the public has been carefully kept back; and with the sole view, as it would appear, of raising a fund to effect a purpose, which we have already shewn to be a ruinous and profitless speculation.

The documents to which we allude will be found to be,—

1. A Book, professing to contain extracts from the minutes of evidence given before the Committee of the Lords on the London and Birmingham Railway Bill.
2. The preamble of the Bill.
3. A numerical list of assents and dissents.
4. The names of witnesses arranged in juxta position with each of the facts stated, under the head of summary of evidence

in support of the preamble. 5. The actual and comparative results of the Stockton and Darlington Railway; and, 6. Facts from which are deduced the advantages of the London and Birmingham Railway, including the whole range of conveyance, from millions in bullion to millions in eggs, and even chickens as soon as they are hatched, down to a "vast deal" of luxury for the *rich*, in the shape of Northamptonshire "*asparagus*," thus reminding us of the "*Battersea bundles*" promised by the far-famed Mayor of Garrat to the people, if they would only elect him to the civic chair !!

In the appendix to the "Book of Extracts," are given the proceedings of the Lords' Committee, on the 8th July, 1832, (for dates are every thing in this case) at which meeting it was resolved, "That it did not appear to the Committee that a case had been made out by the promoters, such as would warrant the *forcing* of the proposed railway through the lands and property of so great a proportion of dissentients, land-owners, and proprietors holding more than 70 miles out of 112 miles along the line.

But it appears also, that another *kind* of meeting was held on the 13th July fol-

lowing, at the Thatched House Tavern, of peers and others *favorable* to the London and Birmingham Railway, at which the Right Honorable Lord Wharncliffe presided as chairman, and the following resolutions were passed unanimously,—

1. Moved by the Earl of Dénbigh, and seconded by Sir Grey Skipwith, Bart. M. P., Chairman of the Committee in the House of Commons, That in the opinion of this meeting a railway from London to Birmingham will be productive of very great national benefit.
2. Moved by the Earl of Aylesford, and seconded by Sir Edward D. Scott, Bart. M. P. That the bill for effecting the important object having passed the House of Commons, after a long and rigorous examination of its merits, it must be presumed that its failure in the House of Lords has arisen from apprehensions, on the part of the land-owners and proprietors, respecting its probable effect on their estates, which, this meeting firmly and conscientiously believe to be ill-founded.
3. Moved by the Earl of Caledon, and seconded by J. H. Foley, Esq. M. P. That, consequently, this meeting see no parliamentary or *other* grounds for abandoning this great undertaking, convinced as they are, that by timely explanations and continuance of judicious management, the difficulties which occurred in the progress of the bill may be removed in the ensuing Session of Parliament.
4. Moved by Edward Peel, Esq. M. P. Chairman of the Birmingham Board, and seconded by the Earl of Denbigh, That the thanks of the meeting be given to the Noble Lord for the honor conferred in taking the chair, and particularly for the valuable and most important observations he had addressed to the meeting.

These papers, therefore, were not fully put forth, till after the whole case had passed

through the ordeal of two committees, one in the House of Commons, and the other in the Lords, so that accident cannot be pleaded for their publication. Yet had they disclosed that a *THIRD PLAN* EXISTED; better grounded, but much more costly, it is quite certain that not one shilling would have been raised upon it; and as no meeting would have been called, Lord Wharncliffe would have been spared the pains of remarking, what we will prove to be quite erroneous, “that the Birmingham Railway was *not* a scheme, like many formed in 1825, for the purpose of profit and traffic in shares;” nor would he have said, “had I observed the least *unfairness* on the part of the promoters, I would myself have been the first to bring it before the House.”

We shall therefore now proceed to place in his Lordship's hands precisely such a case, and we doubt not he will do ample justice to the petitioners. For as our object is, merely to *tell the truth*, as a warning to others, and a safer guide in future for similar investments; we shall be regardless who we please or displease, so long as the facts cannot be disproved, and are important to be made known; leaving the public alone to praise or blame us as we deserve.

Had the facts been published *before* going into the Committee of the Commons, or Lords, as far as regards *revenue* and *construction*, the parties who concocted them might have been deceived; but as the minutes of evidence given on oath before the latter Committee, could not be published till the whole evidence before *both* Committees had been thoroughly sifted for and against the bill, it does strike us as not only injurious to the public, but actually dishonest to the Legislature, and all parties interested, that such documents should be disseminated under the mask of names, rendered doubly dangerous, because influential, and led on by the Directors themselves stating, that a *SELECTION* from the evidence before the House of Lords was

given, from a conviction that it would act more powerfully in removing the objections of influential persons, which had hitherto occasioned the loss of the bill, than any other arguments they could use.

For well might the Directors say this, seeing that on the face of their own documents, all the facts which were the most likely to prevent the removal of those very objections, were carefully suppressed; and knowing also, that even what they did reveal, had been over and over again falsified by the oaths of their own servants and others. Yet even such facts did they send forth to the public after the first defeat, and whilst the fate of the second and last bill was pending, as the most effective means of "wooing and winning" as Lord Wharncliffe called it, "all persons having property to be invaded," and we say, money to throw away.

Yet so far were the Promoters from "wooing and winning" by fair means, that two sections were lodged in the Private Bill Office, for the information of parties interested, as to the cuttings and embankments on their estates, the one distinguished by a red line, which professed to describe the "surface line of railway," although it actually turned out to be a line, indicating the bottom of the cutting, two feet under such surface! By which gross misstatement both Houses of Parliament were deceived, the whole of the land-owners entrapped, and the shareholders injured. Let us, however, turn to the evidence FOR THE BILL before the Committee of the House of Commons in April, 1832, when Mr. Stephenson, jun. stated,—

1. That the width of the bottom of the cuttings on the level of the railway was 30 feet.
2. That Birmingham was 300 feet higher than London, and the Birmingham end of the railway was also 300 feet

higher. The highest elevation was the chalk ridge near Ivinghoe, 467 feet. The level was taken from the sea, commencing at 89 feet, and the lowest 78 feet.

3. That the principal object in selecting the best line for a railway was, to take one, where the difference was least, between the highest and lowest level.
4. That the south or Warwick line to Birmingham, was as much too high above the level, as the Northampton line to the north was too much below it.
5. That the one now chosen was the best practical line,—

Distance by turnpike-road 108 miles.

Ditto railway 112½ ..

Ditto as the crow flies 105 ..

So that the straightest line was in the proportion of 105 to 112½.

6. That a great many alterations had been made to avoid pleasure-grounds, and lessen the inclinations of the line on the plan of last year, among which the greatest was 20 feet in a mile, but which was now reduced to 16 feet in a mile, or one inch in a yard in 330 yards.
7. That these alterations refer to the plan marked with a "red line;" nor are there any other deviations but what are marked by that line.
8. That the line thus laid down, does admit of an easy and convenient rocking of the locomotive engines.
9. That the total extent of cuttings, in round numbers, was 12,000,000 cubic yards.
10. That there would be ten tunnels, measuring nearly 8000 yards.
11. That the land required would be only 1250 acres.
12. That the whole cost was estimated by himself and two other engineers as under:—

For red line plan, including cost of every deviation.

	Steam.	Contingencies.	Total.
1. By Mr. Robert Stephenson	£2,205,352	£294,648	£2,500,000.
2. By Mr. John U. Rastrick	2,125,527	374,473	2,500,000.
3. By Mr. Henry Robinson Palmer	2,143,788	356,000	2,499,788.

But when Mr. Stephenson, jun. was cross-examined for the petitioners AGAINST THE BILL, before the same Committee of the House of Commons, in May, 1832, he stated,—

1. That the 30 feet width at the bottom of the cuttings on the level of the railway were accounted for as under,—

	Feet.
Breadth of each railway five feet, equal to	10
Length of each railway apart, equal to	6
Length of each railway from edge of ditch, equal to ...	12
Width of ditch at the bottom, one foot, equal to	2
Total	30

2. That the width at the top was *variable*, being the whole width from the railway nearly to the side of the cuttings.

The witness was then reminded, that without any allowance for the last consideration, the whole 30 feet were exhausted. Mr. Stephenson explained this by stating, that beyond the bottom of the cuttings there was a surface of ballast to come off, which was two feet, therefore the width of the level of the railway was *considerably more than thirty feet*; the *extra* width being made up of that slope, which was a gradual slope off from the railway, rather quicker towards the ditch, nearly level in the first place, and as it goes from the road, then the inclination increases till you get to the ditch, up to which it is six feet—the half of which is a slope. In fact, one-half was level, and the other was the slope down to the bottom of the ditch. That in reality there were six feet between the two railways, five feet for the breadth of each railway, three feet on each side the rail, and three feet for the slope down to the bottom of the ditch.” Mr. Stephenson, jun. was then asked if he was aware that

in the Leeds and Bradford Committee, his father had stated, that a width of seven feet between each railway was necessary, but witness had no recollection of that fact.*

3. That notwithstanding there were no deviations from the plan of 1831, except such as were marked by the red line section, yet Mr. Stephenson, jun. admitted, that *since* making his survey, an alteration had been made so as to avoid interfering with the metropolitan roads, by raising the embankment over the road at Holloway, to meet the views of the Commissioners, *from seven feet to twenty feet in the first mile*, that is, one inch in a yard in 264 yards, and not 330 yards, as stated in the red line section, but according to the section marked with a black line. Besides which Mr. Stephenson, jun. confessed, that he had not included in the estimate, published by the Directors, any of the expenses consequent upon the additional rise of 13 feet in the first mile, considering them too trivial to be specifically noticed. Although he would not swear that they would be less than 15,000*l.*, yet would he go the length of asserting, they would not amount to 20,000*l.* But Mr. Walker swore to the best of his judgment, that they were fully equal to the latter sum. Nor is this by several, the only deviation, exclusive of additional slopings, the expense

* To prove that the judgment of Mr. Stephenson, sen. is at least on the side of humanity, we need only refer to the following fact:—“An accident fatal to a poor man named Thomas Ryans, took place on the railway on Monday last. Ryans was employed by the Railway Company as a breaksmen; and was engaged in his business on a small train of goods drawn by the Vaulth engine. When within a short distance of a bridge, he, for some purpose, projected his head over the side of the waggon, and, melancholy to relate, came in contact with the buttress of the bridge. The poor fellow's brains were knocked out on his cheek; but he lingered some time before death ended his sufferings,—*Manchester Courier.*” *Morning Herald*, 27th Sept. 1831.

of which is not included in the estimate published by the Directors. For it is said, that the straightest line is not now in the proportion of 105 to 112½, but 105 to 115, thus adding to the cost, if report be true, at least 75,000*l*.

Nor is this the most unfavourable part of the case. For Mr. Walker stated, that the Commissioners for the Holloway Road were about to apply to Parliament for leave to make certain improvements, which would still more *increase* the elevation on the first mile of the railway from 1 in 264 to 1 in 150, that is, from 20 to 35 feet in a mile! so that the line stated by Mr. Stephenson, jun. to be the *best line*, is not unlikely to prove more than twice as *sharp* in the rise as he represented to the Committee.

4. Mr. Stephenson, jun. was then asked, if he thought an arch 18 feet high to the embankment at Holloway, was sufficient to admit of loaded waggons passing under it to and from London; when he said, he considered *Temple Bar* as a good criterion—but was not aware that loaded waggons had never been seen to pass under that arch in the memory of man; although it is notorious, that many of them, from their greater height, are obliged to go by Holborn-hill, up and down which the horses are constantly falling, to the great injury of the owners. In explanation however, Mr. Stephenson observed, that the Commissioners considered a height of 18 feet, “a very good thing” as it would correct the evil of over-loading, by “keeping the height down.”

Mr. John U. Rastrick, another engineer for the bill, when cross-examined stated, that many of the other arches to the embankments along the line were not more than 16 feet—and many only 12 feet high. Yet Mr. Ste-

phenson, jun. admits, that the chimnies to the locomotive engines vary from 22 to 14 feet, but may probably be lowered—though Mr. Stephenson, sen. was of a different opinion.

5. Mr. Stephenson, jun. was then examined touching another deviation from the plan of 1831, by the proposed diversion of the River Avon, to enable him to carry the railway *three* times over the latter with *only* one bridge. He was asked “if he left the old channel of the River, how was that to be done?” when he stated, that “the culvert would be made so that the water could be got to supply the land-owners the same as at present; he should merely make a new channel to take away the water which might come there in floods.” The question was then again put.—“Still if any water be left in the old channel at all, how could the railway be carried across the river *three* times with *only one* bridge?” When Mr. Stephenson again replied, “with a culvert merely.” Yet said counsel once more, “the railway is to cross the river *three* times, is it not?” Answer, “Oh, of course it is.”

But Mr. Walker asserts, that he never heard of such a step without having the line to be diverted, distinctly marked on the section, especially with no power in the Act for making it. Yet granting that the land-owners were willing that such a diversion of the river should be made, to admit of so novel an exhibition as that of a Railway tripping across it in three different places with only one bridge, it must give rise to large additional cuttings, and otherwise add greatly to the cost; although Mr. Stephenson, jun. fairly admits, that he has not included one farthing for such expenses in the estimate published by the Directors.

6. Mr. Stephenson, jun. then confessed that the expense for *Drainage* along the line, was also not included in the esti-

mate published by the Directors, although Mr. Macneill and others have calculated the amount to be more than £50,000.

Mr. Walker also states, that the drain proposed by the *red line section to be one foot wide at the bottom of the cuttings*, sloping with the ground, would be very inconsistent with *stability*; because, as there is a *water course*, the latter formed at the foot of a cutting, would be very injurious to the foundation and *permanence* of the embankment; neither would it stand, unless faced with brick work: for if it were not so protected, the water running through with considerable velocity, in a thunder storm, would carry the clay along with it, and, in a very short time, *undermine* the embankment. This item alone, in Mr. Walker's judgment, would cost £47,220.

Nor is this the only drainage heavily objectionable. For there are other drains, measuring only *six inches in diameter*, equally condemned by Mr. Walker; "because," observes this experienced engineer, "should any *stoppage* happen, even a boy could not get to it, and thus the embankment might be destroyed without the means of saving it."

7. Mr. Stephenson, jun. admits, that the *actual* extent of his estimate for cutting was 11,685,000 cubic yards, being 312,000 cubic yards *less* than published by the Directors: but that this calculation did *not* include the excavation of ten Tunnels, measuring nearly 8000 yards.

8. That the total extent of embankments was 10,749,559 cubic yards, making, including cuttings, 22,431,559 cubic yards.

9. That although it had been stated that borings had been made to ascertain the nature of the soil, previous to making the estimate of cost, yet, only three out of the ten Tunnels had been bored for that purpose, including one a mile and a half long; the rest having been settled by general observation!

10. That the land was only 1250 acres, including Depôts, Stations, and Bridges. Yet Mr. Gravatt, one of the engineers for the petitioners, states, (and there was nothing to shake his evidence on either side,) that the *spoil* alone, in consequence of the embankments not requiring what is taken out of the cuttings, calculating that such land stands at 15 feet, in order to save the land and strengthen the embankments, will be 264½ acres. that is, so much ground will be destroyed, besides 38 acres more for *spoil* out of the Tunnels; making in the whole 302 acres; whilst the aggregate quantity, *exclusive* of land for Depôts, Stations, and Bridges, will be 1749 acres, being 499 acres more than Mr. Stephenson, jun.'s estimate, although the latter *does* include land for Depôts, Stations, and Bridges.

Thus assuming the whole 3000 miles of Railway to be carried into effect, as contemplated by the Treasurer of the Manchester line; and the proportion of land utterly destroyed and occupied, to be the same as shewn by Mr. Gravatt, for the Birmingham line; and allowing each individual to consume annually three quarters of corn it results, that the bread of nearly fifty thousand families may be sacrificed to a ruinous and profitless speculation!

But notwithstanding the whole of these facts were known to be quite incontrovertible, and increasing prodigiously the cost of construction, yet, did the Directors persist in publishing the estimates of their own engineers, for a plan, which one of them, and that too Mr. Stephenson, jun. himself, had previously sworn was most materially changed, if not abandoned altogether.

Still, if the Directors determined to adopt estimates knowingly so grossly fallacious, merely, because the figures for the Bill looked more inviting to the eye of capitalists and jobbers, what will Lord Wharnccliffe, the Chairman of the Thatched House

Meeting, and Sir Grey Skipwith, Bart., M.P. and Chairman of the Committee of the House of Commons say, to the following statements, entirely shut out from public notice, and this too at the very moment the former was declaring to his noble and honourable associates, that he had seen nothing *unfair* on the part of the promoters of the Bill.

It is right, however, that the public should know on whom we depend for the accuracy of our figures :

Mr. Macneill was first chosen by the petitioners against the Bill, to examine the whole line. He exhibited superior talent and intelligence in his evidence before the House of Commons on Steam Carriages; and has been many years engaged with Mr. Telford and Sir Henry Parnell, in certain improvements on the Holyhead Road, having been appointed resident engineer to the Parliamentary Commissioners for that undertaking.

Mr. Walker has practised as an engineer for 25 years. He is consulted upon every kind of Public Works—including the Manchester and Liverpool Railway line, and the far greater part of all the others now before the public; is Engineer to various public bodies—and the Commercial Road, East India Road, Barking Road, and Vauxhall Bridge Road, were constructed under his direction.

Mr. Cubitt is equally well known, having practised as an Engineer almost as long as Mr. Walker; is principally engaged in the Norwich and Lowestoff Navigation, including a ship canal and harbour; besides which, the Works of the Oxford Canal are placed under his care.

Mr. William Gravatt, F.R.S. was educated under Mr. McDorkin; engaged for two years with Mr. Brunel, and partly during the progress of the Thames Tunnel.

These authorities value the cuttings and embankings as under :

RED LINE PLAN.

	Mr. Macneill. Cubic Yards.	Mr. Walker. Cubic Yards.	Mr. Gravatt. Cubic Yards.
Cuttings	16,897,392	16,873,717	17,047,843
Embankings	11,452,374	—	10,457,843
Total	<u>28,349,766</u>		<u>27,505,686</u>

BLACK LINE PLAN.

	Mr. Walker. Cubic Yards.
Cuttings, 10 yards wide at the bottom	18,488,265
Do. by Mr. Stephenson, jun. for Red Line	11,685,000
Total more than Mr. Stephenson, jun.	<u>6,803,265</u>

Mr. Walker admits that his calculation at first, was made for the *red* line plan. But in consequence of a question put to Mr. Stephenson, jun. in his cross-examination, he applied to that gentleman for *further* information, so as to enable him to complete his figures in time for the Committee; but *failing* to obtain a satisfactory reply, Mr. Walker arrived at the last result, *after* the facts had been elicited from Mr. Ste-

phenson, in his *cross-examination*, for the *black line plan*.

Yet do the Directors entirely *exclude* from their select evidence published "*to remove objections*," so as to "*woo and to win*," this enormous difference of nearly SEVEN MILLION CUBIC YARDS OF CUTTINGS, between their own estimate for the *red line plan* which is published, and that for the *black line plan* which is not published;

although the *latter* is supported by the uncontradicted testimony of *four* of the principal engineers in the kingdom, against the dictum of Mr. Stephenson, jun. and two

others, one of whom, we shall presently shew, was not quite so *unwise* as to continue *long* of the same *persuasion*.

ESTIMATES AGAINST THE BILL FOR CONSTRUCTION.

	Total for Earth-Work, merely to make the road level, including contingencies, but not interest of money.	Red Line Plan. Total.
1. By Mr. Macneill	£1,076,307	£3,305,436
2. By Mr. Walker	1,231,079	3,417,830
3 By Mr. Gravatt	1,131,794	3,269,364

The difference between the above Estimates and those for the Bill, is principally owing to a more *liberal* allowance for *sloping*, and, the great additional expense for cuttings, land, bridges, drainage, &c.; whilst the total cost of the *black* line plan is as under :

1. By Mr. Macneill	£3,500,000
2. By Mr. Walker	3,500,000
3. By Mr. Cubitt	3,500,000
4. By Mr. Gravatt	3,500,000

Nor is it to be wondered, that rumour should give to Mr. Rastrick, one of the Engineers for the Bill, the *credit* of having *changed his figures*, if not his party, and estimated the cost of the *black* line *within a trifle of all the four Engineers against the Bill before named*.

But although the directors may say, that they were *not* bound to open the eyes of the public, so long as they were borne out by estimates of three of their own engineers, however **WRONG THEY KNEW THEM TO BE**, still, when one of the former was found to agree (if report be true) with *four* such engineers as we have described, to an addition of **ONE MILLION STERLING**, thereby striking off from the profit fifty thousand pounds per annum at one blow, besides the odd forty thousand pounds per annum *proved* in another place, and 49,595*l.* over credited from fly boats, making in all 139,595*l.* per annum, surely this was ground enough for no longer **CONCEALING** such a *prodigious deduction*. Yet in the face of even these facts, still did they issue these deceptive papers, because by deception alone, could they expect either money or triumph. Accordingly, at the meeting held at the Thatched House Tavern, all persons *not favourably disposed* towards the Birming-

ham Railway, were carefully *excluded*; so that, doubtless, the noble chairman, and all the noble and honourable movers and seconders of the resolutions, were as ignorant of the facts now disclosed, as they were of the "*north west passage*," which yet remains to be discovered;—or knowing, did not reflect sufficiently on the consequence of disclaiming all "*unfairness*" on the part of the promoters of the bill.

Look at the case of the shareholder. A. B. has a small property, and being desirous of doing the best he can for his wife and family (having great faith in the integrity of the directors,) calls at their office to make a few inquiries *previous* to investment, touching the published income exceeding 738,000*l.* per annum, and the capital, said to be sufficient, 2,500,000*l.*

The Secretary, with all the politeness due from one gentleman to another, but with an eye to business, hands over to A. B. the six documents we have described—satisfied that he had not mistaken the integrity of the promoters, the latter sells out his stock, signs the deed of settlement, and waits patiently the result.

At the end of the first six months a general meeting is convened—a report is read, when the shareholders are told that

many *unforeseen* difficulties have arisen—that more money must be subscribed or borrowed—the one sinking the shares and both the *purses* of the original holders. The unfortunate A. B. soon finds himself in the same boat with a multitude of others (chiefly depending more or less for future favors on the Directors) tongue-tied and powerless. The next report announces the creation of new shares, or annuity bonds, the latter to be paid first. A. B. is called upon to subscribe—is tempted to save himself—finds out deception—objects to pay—his shares are threatened to be forfeited—remonstrates—pleads misrepresentation,—in vain—his shares sold, not by his own will, but by the Directors at 90 per cent. discount—his credit blasted as a defaulter—balance returned after paying all calls due, *SIXPENCE*,—thus sold out and up—time wasted—other objects gone, he gradually gets worse and worse, and finds himself, at last, a beggar!

But as impositions of no ordinary character were proved against the promoters of the bill, and confirmed, it is said, by one of their own engineers, the former grew more and more desperate to beat down all opposition by stratagem at least, if not by *truth* alone. Accordingly no slight disposition was manifested to fasten upon Mr. Walker, and all the other *four* respectable engineers, including even Mr. Rastrick, their own engineer, an *error* in their calculations to the extent of *one million sterling*!!! Although such errors could not be made, without proving, that *one* of the railway plans had been *designedly* concocted for the purpose of *entrapping* the petitioners or their agents into a charge of *miscalculation*, in the same way that Lord Wharncliffe and the other noble lords and senators were *entrapped* into the meeting at the Thatched House Tavern—a species of trickery that no one would credit, looking to the highly honourable names of the directors of the Birmingham Railway, were it not for the facts we have disclosed.

Yet, Mr. Walker was asked in cross-examination, whether he had *not* made all his calculations under the supposition that the cutting was to go *two* feet below the *red* line, as shewn upon the plan in the Private Bill Office. Mr. Walker replied *he had*, because the red line laid down upon the deposited plan was described thus, "*The Surface of the Line of Railway*," or words to that effect, the *red* line indicating (as before stated) the *bottom* of the cutting upon which *two* feet of ballasting were to be placed. The question was then put hypothetically. Suppose the *red* line did *not* denote the *level* upon which the line is to pass, but the *depth* of the cutting, is there not *then* an *error* in your calculation to the extent of two feet? Yes; but that is an error not on my part, but one, for which the promoters of this bill would be very culpable for leading me and the public into; and he would not suppose it possible, that the respectable engineers engaged for the bill would lend themselves to such an error. Yet such an error, however, was committed, and subsequently confessed! after the trick had fully succeeded.

But whether there was a mistake or not on the part of Mr. Walker, in mistaking the superficial line for the line indicative of the depth of the cutting, it is quite evident, that as Mr. Stephenson, jun. admitted the superiority of the *BLACK LINE PLAN*, though confessedly more expensive than the former, it was for him to state the exact difference of cost between the two plans deposited in the Private Bill Office, and for the directors to have made that difference known to the public, and to all parties interested. If then either Mr. Stephenson, jun. neglected to apprise the directors, or the latter neglected to apprise all parties concerned, it is equally plain that a wilful error has been committed by one or both, of no trifling character. Because the capital requisite for the least expensive plan, could not be sufficient for one more expensive, and conse-

quently the shareholders will be called upon, previous to the completion of the work, to subscribe more than they calculated; whilst all who fail in means will be driven to sell at a ruinous sacrifice, or forfeit their shares altogether.

But the directors have entirely omitted to notice in the very copious extracts for the bill even this remarkable occurrence, although it was under discussion last session for some weeks, and the bill was very nearly lost a second time upon it. In fact, had the whole of the impositions then been fully made known, which are now dis-

closed, the bill must have been thrown out.

With such facts before us, it may be well to know, what was the state of the opposition to this bill, in a committee, in which we shall prove at least, that another of the members, besides the Chairman Sir Grey Skipwith, Bart. M.P., must have strangely misunderstood the whole of the proceedings, before the measure was finally carried, by trickery, legal cunning, and misrepresentation. In the Private Bill Office, the result will be found as under in 1832.

	Miles.	Quarters.	Yards.	No. of Proprietors.
Dissents possessing in 112 miles	.... 71	.... 0	.... 419	.... 269
Assents " "	.... 15	.... 1	.... 22	.... 105
Neuters " "	.... 17	.... 0	.... 199	.... 79
Special Answers "	.... 8	.... 0	.... 110	.... 50
Total	... 111	2	310	503

For the Petitioners loudly and justly complain, that land-owners of property extending over 112 miles in length, have been entrapped: some of the finest estates in England placed at the mercy of individuals not remarkable for wisdom or fair dealing; yet vested by Parliament with full authority to exercise powers sufficiently arbitrary, to cut, hack, separate, and destroy, nearly 2,000 acres of land, by immense "GASHES" stretching far and wide, more like trenches for ship canals than roads for land conveyances; and by MOUNDS, more like Alpine projections than ordinary embankments; in fact, to commit just what havoc, invasion, or evasion may be best suited to the undisclosed views of the promoters: after having "won and wooed" from the Legislature, the right to do so, not by honest means, but by designedly concocting a red and black line section for one and the same line, the former blushing, as well it might, for the truth it concealed, and the latter doubtless in mourning for the extra cost it would lead to.

But as the ingenious device of concocting sections, wearing, Janus-like, *two* faces, is

not likely to work well, though doing *double* duty, for the credit of either House of Parliament, or the good of society at large, it remains for the parties aggrieved, to do their utmost to expunge from the statute book, a libel upon common sense—and an insult to the collective wisdom of the nation.

The shareholders also complain, not less loudly or justly,—that they have been wilfully deceived and kept blindfolded before and since their signatures were "wooed and won" to the Deed of Settlement, by parties self-nominated, or appointed by a self-created power:—that such individuals have assumed to themselves a discretionary and irresponsible power;—issued prospectuses and estimates, not verified by fact;—doubled the capital for constructing lines of railway, which the Petitioners did not subscribe to, and abandoned others they did subscribe to:—suspended and renewed applications to Parliament, and acted upon the most important occasions secretly and without the knowledge of the Subscribers, or their sanction in general meeting assembled;

whereby the Petitioners have been precluded from obtaining sufficient information respecting the subscription list, and other documents deposited in the Private Bill Office, whilst by the latter document alone it has since been discovered, that such list is 739,000*l.* short of what is necessary for the *least* expensive plan, consequently the Petitioners entreat to have their names struck out of the Bill, and all such parts of the preamble and provisions thereof as may most affect their rights and interests.

The passing, therefore, of a bill with so small a proportion of assents, is believed to be wholly unprecedented in the practice of either House of Parliament; and this alone, coupled with divers acts of wilful misrepresentation, which we have proved incontrovertibly against the promoters of the scheme, on the evidence of their own authorities, may yet ensure to the petitioners, that redress which justice demands.

Among the petitioners are to be found a body of shareholders, having not less than one hundred thousand pounds sterling at stake; members belonging to three banking firms; four ex-directors, and other influential persons in and near Birmingham; surely then such parties must be much better acquainted with the merits of the project than a great majority of the projectors, residing at Manchester, Liverpool, and other parts almost as distant from Birmingham; whilst the names of the former will doubtless, even now, have due weight with Parliament, as grounds for rescinding the measure altogether.

We know that in equity cases, Lord Eldon, and other Chancellors before him, have held, that even although a decree has been signed and enrolled, and fraud is afterwards proved to have been committed, *so as to deceive the court*, it upsets all the proceedings. For the suitors must *do* equity before they have any right to obtain it. Nor do we see any reason, why a higher tribunal should act with *less* justice than one holding au-

thority under it; and this doctrine, we are quite sure, must be in unison with the legal and moral creed of Lord Wharcliffe, especially after his declaration at the Thatched House Tavern. We therefore subjoin a summary of the case, and petitions in Parliament, with the names of the principal dissentient, landowners and shareholders, holding the entire documents for inspection whenever they may be wanted, including the general case in Parliament for appeal as well as REPEAL.

But to shew the kind of justice which the petitioners at last obtained, owing to a flood of misrepresentation, which seemed to carry reason, equity, and every thing before it. Sir John Wrottesley, Bart., M.P. one of the advocates for the measure, and a member of the committee, took occasion to state to the house, in June, 1832, that he had never in the whole of his parliamentary experience, been in any committee, where the members showed greater "*impartiality*" or more "*assiduity*" in their attendance, than on the committee of this bill; and that "he knew no case in which the accuracy of the engineer's estimates had been so satisfactorily established."

With respect to the "*impartiality*" of the committee, Sir John was a member of it, and therefore shared no small portion of his own *panegyric*. But not having attended himself for the *first seven days* of its sitting, his own "*assiduity*" was not more conspicuous than his claim to "*impartiality*;" and when he stretches his fancy so far, as to praise the "*accuracy of estimates*," which we have proved to be founded not only on *error* but *ignorance*, and that too of a nature pregnant with the most injurious consequences to society at large, we question whether he was the best qualified to pass an opinion on the subject, much less to give a verdict upon it.

But granting that the act should not be repealed; still we should not be surprised if the Birmingham Railway, opposed by many of its own subscribers, and by a great majority of the total interests of the

country, should meet at last, with the fate of the Manchester and Sheffield Railway, for which an act was previously passed. The proprietors themselves having wisely come to a resolution, grounded on a report of a sub-committee, that it would be highly inexpedient to proceed with the undertaking, as the concern did not appear likely to be profitable to the shareholders, because a *considerably greater capital than what was subscribed would be required to complete it*; and hence the *profits diminished accordingly*. For reasons have been given in our preceding remarks not less conclusive for the Birmingham Railway, terminating in a similar way, seeing that by difference of outlay and profits, the income for the latter is proved to be ninety thousand pounds sterling per annum less than represented to the shareholders, besides other disadvantages wholly concealed from their view. Even were the certainty less than what it is, that a cheaper method of conveyance will be afforded, by improved canal navigation, and steam carriages on common roads.

Having thus brought our case to a

close, we commit it, with every deference to the hands of the noble Chairman of the Thatched House Meeting for the Lords, and to Sir Grey Skipwith, Bart. M.P. Chairman of the Committee for the House of Commons, as most likely to know the real merits of the case, although they might not have been altogether so fresh in their memory at the Thatched House Tavern Meeting:—and have only to add, *that after such an exposure of the impositions which have been practised upon landowners, shareholders and others, many may be anxious to free themselves and their heirs from the ruinous obligation into which they have been plunged, and under such circumstances, we shall spare no pains, not only to mark out the line by which the whole may be set free promptly and cheaply, but how they may recover any loss sustained by wilful misrepresentations on the part of those who knew the truth to be as opposite to their own shewing as red was to black.*—Letters addressed, post-paid, to “*VERITAS*,” care of the Editor of this Journal, with real name, will be attended to.

SUMMARY OF PETITIONS AND CASE, &c.

Against the Birmingham Railway, with names of the Petitioners and Dissentients.

We have four important documents upon this subject before us, which we could have wished to have given at full length, but want of space compels us to compress them into the following summary:

“To the Honorable the Commons of the United Kingdom, in Parliament assembled.

“*The Humble Petition of the under-signed Subscribers to an intended Railway from London to Brighton.*

“*SHEWETH,*

“That a project for this Railway was first promulgated in the spring of the year 1830, and that your Petitioners, amongst others, subsequently signed the subscription list and contract deed.

“That a second project for a similar purpose, but with a different line, was pro-

mulgated by other parties early in the same year.

“That the Directors of the two projects were self-nominated, and that their appointment has never been submitted to, or confirmed by, a general meeting of Proprietors.

“That the said two projects were after-

wards united by means of coalition between the Directors of the respective Companies, though without the sanction of a general meeting of Subscribers; that the said Directors, since such coalition, have materially altered the originally contemplated lines of the projected Railway.

"That the estimated expense was in the first instance 1,500,000*l.*; in the second 2,000,000*l.*; and in a third 2,500,000, &c.; and that not one of these estimates was submitted to, or approved of, by a general meeting of Subscribers, &c.

"That a contract deed, with subscriptions to the amount of 1,761,000*l.* only, has been lodged in the Private Bill Office, being a deficiency of 739,000*l.* on the total sum required to complete the said undertaking, according to the estimate at present made thereof.

"That your Petitioners would not have signed the contract deed, had they known that the Directors proposed to assume to themselves a discretionary and irresponsible power of doubling the estimate, of

abandoning and altering the projected lines, of suspending and renewing their applications to Parliament, and of acting on the most important occasions without the knowledge of the Subscribers, or their sanction in general meeting assembled.

"That in consequence of these secret, irresponsible, and unsanctioned proceedings of the Directors, your Petitioners and others have been precluded from obtaining sufficient information with respect to the subscription list and other papers recently deposited in the Private Bill Office, and that they apprehend, and have reason to believe, that they may be involved in large payments in support of the project, by reason of the insufficiency of the subscription list.

"Your Petitioners therefore humbly pray, on behalf of themselves and other Subscribers, that they may not be deemed or taken to be Subscribers to the present undertaking, and that their names may be erased from the subscription contract," &c.

This Petition was followed by a Second, from which we extract as under:—

"That since your Petitioners became subscribers, various important improvements have been made, and are still in daily progress, in the construction of Steam Carriages to travel on the ordinary high roads; and that, at the present time, many able and experienced mechanics, with the most undoubting confidence of eventual success, are devoting their utmost energies and skill to the completion of such improvements.

"That, without indulging in any extravagant expectations, your petitioners conceive, that there is every reason to hope, that within no long time, these steam-carriages, by means of successive improvements, will be brought to such a state of perfection as to admit of their being advantageously used upon turnpike roads without the expensive accompaniment of a railway.

"That your petitioners, in support of

their opinion, and in proof that the same has not been rashly and unadvisedly adopted by them, humbly beg leave to quote the high authority of a Committee of your Honorable House, directed, amongst other matters, to inquire "into the present state and future prospects of land-carriage by means of wheeled vehicles propelled by steam or gas on common roads;" That in the Report of such Committee it is stated, "That the substitution of inanimate for animal power, in draught on common roads, is one of the most important improvements in the means of internal communication ever introduced. Its practicability they (the Committee) consider to have been fully established," &c.

"And your petitioners moreover humbly beg leave to state to your Honorable House, that this conclusion was not arrived at by such Committee until after a careful and laborious examination of many witnesses

distinguished by both practical and scientific knowledge.

"That so long as there is a reasonable probability, that steam-power may be advantageously and cheaply applied to carriages on the ordinary high roads, it appears to your petitioners not only unnecessary, but eminently rash and impolitic, to proceed without pause in the formation of the proposed railway, accompanied, as the project must necessarily be, by an enormous expense. And your petitioners are the more surprised at such precipitancy, because they are at a loss to conceive that any mischief could possibly result from a temporary suspension of the said railway undertaking, until something like a clear and determinate opinion could be formed

with respect to the feasibility of applying steam-power to carriages on the ordinary roads.

"That the estimate cost of the proposed railway is no less than two millions and a half sterling, an amount of money startlingly enormous, and such as, most unquestionably, ought not to be expended, without a reasonable and strong expectation, that it may be the source of proportionate national and individual advantage. But that, under the circumstances, your petitioners cannot but fear, that, should the scheme be incautiously proceeded with, the whole amount laid out may prove a dead and abortive expenditure to your petitioners, and a loss of so much capital to the nation at large.

"Your petitioners therefore humbly pray that your Honorable House will be pleased not to pass a certain Bill, now pending before your Honorable House for the making of the said railway.

"And your petitioners shall ever pray, &c.

"(Signed)

JOS. SCHOLEFIELD,	WILLIAM POTTS,	THOMAS ATTWOOD,	WILLIAM POOLTON,
THOS. COTTERILL,	JOHN LLEWELLYN,	GEO. ATTWOOD,	JOHN ROTTON,
JOHN MABSON,	B. REDFERM,	ROBT. WRIGHTSON,	RICH. ROTTON,
JOSEPH SHORE,	THOS. RYLAME,	THOS. MESSENGER,	S. J. LOMLEY,
F. F. SHORE,	FRANCIS LEIGH,	C. C. SCHOLEFIELD,	JACOB POPE."

From a "*Statement of the Case of the above Petitioners, for a Committee of Appeal, respecting the variation of the surface of the railway from the red line on the section,*" in reference to that circumstance we give the following quotation:—

"That there is no doubt but that the explanation given by Mr. Stephenson, the Company's engineer, upon which the discovery of this circumstance arose, was for the purpose of accounting for a difference between his estimate and the engineers employed by the landowners."—And it is added in consequence,

"Every proprietor and occupier, whether

landowner, trustee of roads or otherwise, who has inspected the section, either where the plans are deposited, or upon being applied to for their assent or dissent, have been misinformed as to the surface and level of the railway, and consequently what the expense of the undertaking will amount to."

In addition to the above, a Petition from several Land-owners was presented to the

House of Lords against this measure (amongst others) upon the following grounds, which are fully confirmatory of our statements :—

CASE of such Petitioners against the Bill.

“That the railway embankments and cuttings will be injurious to their property, and compel some of their tenants on the line to abandon their residences,” &c.

“That the undertaking is projected on fallacious calculations and estimates, with-

out local knowledge or local support ; and against the consent of a great majority of landowners, as appears by the state of the assents and dissents of the proprietors of estates *through* which the railway is projected, as already given,” &c.

The following are some of the principal proprietors included in the dissents :—

Duke of Grafton
Marquis of Camden
 „ of Hastings
 „ of Hertford
Countess of Bridgewater
Lady Lovett
 „ Hawley
 „ Senhouse
Earls Essex
 „ Chesterfield
 „ Digby
 „ Brownlow
Lord Northwick
 „ Southampton
 „ Farnborough
 „ Clive
 „ John Scott
Right Honorable R. Ryder
Honorable Colonel Howard

Honorable Thomas Morison
Provost and Fellows of Eton College
Christchurch College, Oxford
All Souls, Ditto
Sir J. Hawley, Bart.
Sir W. Wake, Bart.
Sir Charles Knightley, Bart.
Sir John Filmer, Bart.
Sir Eardley Wilmot, Bart.
Sir Thomas Gooch, Bart.
Trustees of Radcliffe Library
Chandos Leigh, Esq.
T. R. Thornton, Esq.
J. A. Gordon, Esq.
Robert Clutterbuck, Esq.
E. F. Whittingstall, Esq.
P. D. P. Duncombe, Esq.
The Corporation of Coventry, &c.

with the Trustees of most of the turnpike roads on the line.

of RAILWAYS.

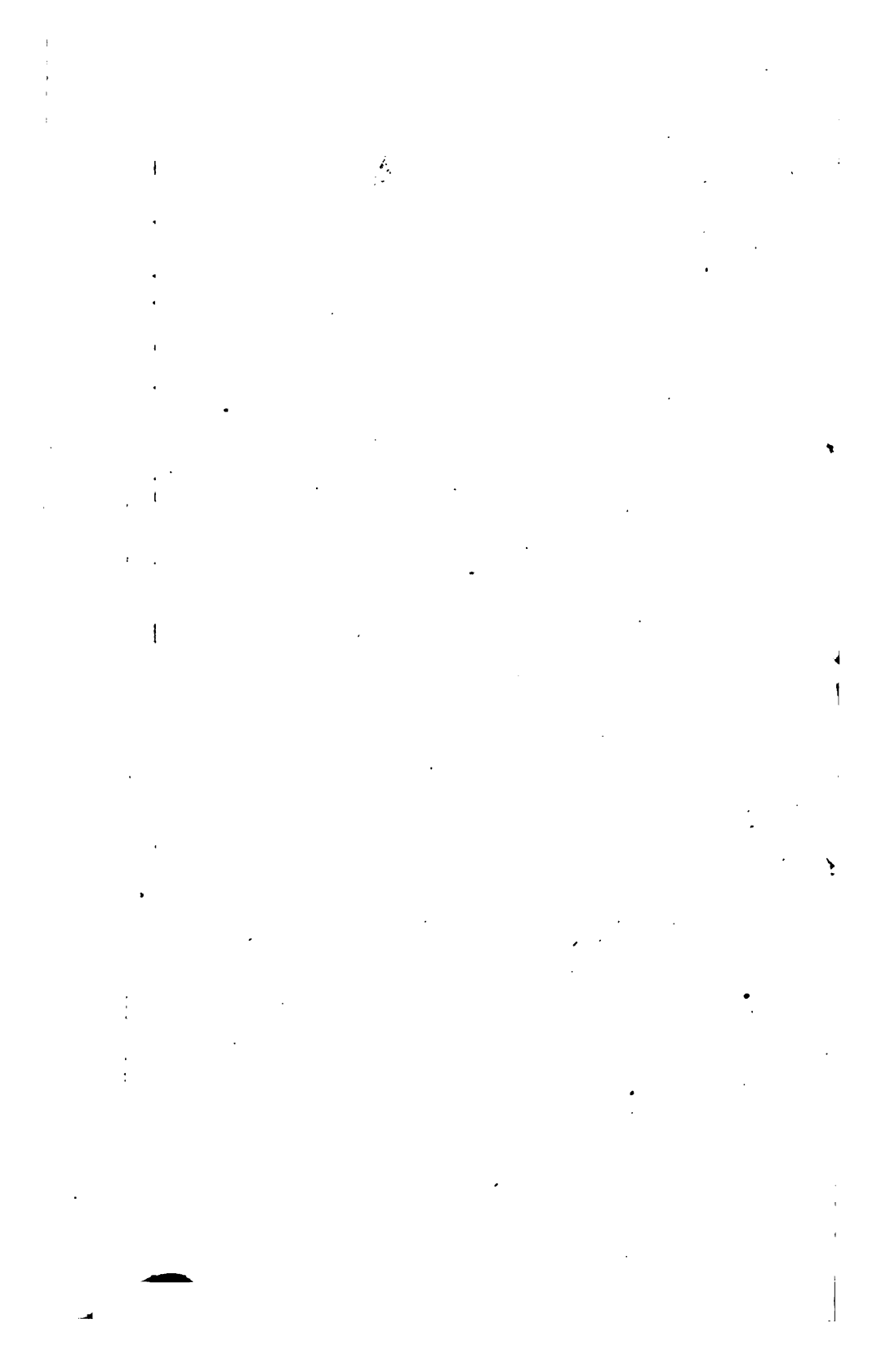
Miles, and BRISTOL 120 Miles.			
Miles.		Rate per Manchester and Liverpool Line, mile for mile.	
	Total.	Less.	Total.
	£.	£.	£.
	590,000	193,255	783,255
	825,374	25,091	850,465
	1,379,014	402,991	1,782,005
	2,794,388	621,337	3,415,725
	500,572	868,303	1,368,875
	1,015,592	150,183	1,165,775
	270,600	279,300	549,900
	139,500	269,165	408,665
		783,255	783,255
	779,348	1,099,712	1,879,060
	5,500,000	4,071,255	9,571,255

ster rail- line.	Total actual Cost, same as Manchester and Liverpool Rail- way, Mile per Mile.
	£.
	1,222,054
	4,684,295
	4,887,960
	3,136,441
	1,914,451
	814,660
	16,659,861

fractions have been rejected for brevity

£20,397	.....	£7,034
20,397	.....	5,629
100,000	.....	21,212
181,061	.....	28,868
199,249	.....	20,925
739,175	.....	11,823
Total underrated	..	95491

's interest to the opening of the Railway in September
more than 100,000/.



in the following Table.

	Coal Department.	Bolton Tonnage.	TOTAL.
	£. s. d.	£. s. d.	£. s. d.
D	.....	183 4 0	12,625 12 2
D	.....	.....	7,455 1 1
P	97 1 5	.....	97 1 5
L	339 7 6	.....	12,203 5 6
S			
	39 12 9	409 14 9	10,244 0 8
R			
	29 14 7	155 17 6	6,400 17 7
	505 16 3	748 16 3	49,025 18 5
	189 18 1	993 4 9	40,783 3 7
B	695 14 4	1,742 1 0	89,809 2 0



V.

ed in the following Table.

No. ft.	Coal Department.			Bolton Tonnage.			TOTAL.		
	d.	£.	s. d.	£.	s. d.	£.	s. d.	£.	s. d.
6		.....		213	5 2	11,819	0 8		
		.....		.....		5,669	14 9		
		26 8 10		.....		26	8 10		
9		483 16 10		.....		10,582	16 2		
0		304 3 7		655 12 2		10,403	2 6		
0		308 13 3		264 1 8		8,157	8 5		
3	1,123	2 6	1,132	19 0	46,658	11 4			
10	1,061	5 0	908	0 11	28,048	4 9			
1	2,184	7 6	2,040	19 11	74,706	16 1			

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GENERAL REVIEW OF STEAM CARRIAGES

During the last Six Months, and calculations as to the expense of working them: with Report of the trip upon the Holyhead line, by a Committee of Engineers.

The extension of Steam to general locomotive purposes upon land, seems destined to encounter equal discouragements, and to experience the same delays that opposed and postponed its applications upon water. The Gordian knot, as to the possibility of directing the power of an engine upon the wheels of a carriage, in such a manner as to propel it along a common turnpike road, has long been cut. The problem in mechanics, which the whole scientific world clung to, as an axiomatic truth, viz. that the periphery of a wheel had not sufficient hold upon the ground to render it an available fulcrum, has been experimentally exploded. And Gurney, Dance, Hancock, Ogle, Macerone, Squire, Gibbs, Church, Frazer, Heaton, Smith, Clarke, &c. have, in the face of all opposing theory, and after surmounting personal and practical difficulties incredible, established by numerous, successful, unquestionable experiments, the possibility of substituting Steam for purposes of brute-animal labour. But though the year 1825 will ever be memorable in the annals of invention, as the era in which practical Science was no longer to confine herself exclusively to accommodate matter for the use and the comfort of human life; nevertheless, the application of Steam to economic uses, has occupied but a small portion of the attention of the thinking public. The philosopher's stone has indeed been discovered; but, as yet, it has been made to convert nothing into gold. Individual projectors have all and each been allowed to expend their means, their time, their energies, in maturing a project, which is to bless and better the social condition of this, and every succeeding generation, unassisted by the wealth of the great, the wisdom of the learned, the

power of the government, the encouragement of the nation.

Whilst Fulton was building the first Steam-boat, the "Clermont" at New York, we are told that he was treated as an idle projector, whose schemes would be useless to the world, and ruinous to himself. The labours and difficulties he had to encounter and overcome were unvalued and uncheered. The language of the idle groups, whom curiosity attracted to see the new Vessel, was uniformly that of scorn or disparagement. The loud laugh often arose at his expense, the dry jest, the wise calculations of losses and expenditures; the dull but endless repetition of, "*The Fulton Folly!*" "Never," says that martyr of ingratitude, "did a single encouraging remark, a bright hope, a warm wish, cross my path. Silence itself was but politeness veiling its doubts, or hiding its reproaches." Even when the day of trial came—that day so brilliant in the scientific records of the West, when the stately STEAM SHIP first threw off the dominion of the winds of heaven and walked the waters like a thing of life—in which the illustrious inventor should have reaped the first fruits of the well earned harvest of his imperishable fame—amongst the friends whom he had invited to witness the experiment, all was silent and moody distrust. "I read in their looks nothing but disaster, AND ALMOST I REPENTED ME OF MY EFFORTS." To the silence upon the first movement, succeeded, upon a short and trifling interruption to their progress, murmurs of discontent, agitations, shrugs, and whispers. "I told you how it would be;"—"It is a foolish scheme;"—"I wish we were well out of it."—These were the observations which entertained the Projector

upon this interesting, and to him most trying, occasion. Even when the vessel was finally got in motion,—when she continued to move forward,—all were incredulous. “We left the fair City of New York far behind us;—we passed through the romantic and ever varying scenery of the majestic Hudson;—we descried, at length, the clustering houses of Albany,—we reached its distant shores; and then, even then, when all seemed achieved, I was the victim of disappointment. Imagination superseded the influence of fact: it was doubted if it could be done again; or, if done, it was doubted if it could be made of any great value.”

Of any great value!—even so; and yet the conduct of Great Britain, with regard to the application of Steam to carriages on common roads, is exactly parallel. The inventors have been exposed to the same cold and mortifying circumstances of discouragement and neglect: and the object they propose has been regarded with the same scepticism as to its usefulness and value. But what is ingratitude towards them, is fatuity towards ourselves. For what in America unencumbered, and in the infancy of her science, was at worst only the thoughtlessness of youth,—in over-burdened Britain, amounts to all the imbecility of age. Besides, the application of Steam to the Boat, was to produce no such numerous and mighty benefits as are to flow from its extension to the Team. The sail, which it has struck down, consumed no provisions; nor was it attended with the substitution of human labour for that of brute. Even if it had been so, America would have been excusable. She had no superfluous hands to provide labour for; nor any multitudes of human mouths, clamorous for the food which she could not raise. Through her ample borders there was abundant plenty: in all her habitations prosperity and peace. In putting away from her, therefore, for a season, a power, which has since connected in busy intercourse her most distant ter-

ritories, and changed the character of her whole social and commercial relationships,—she was not also guilty of putting away what would have supported millions of a starving population, if she had had them, and given occupation to millions of unemployed poor. No,—her resources were new and unbounded,—her domain illimitable,—with labour and food alike redundant. But, how stands the case as regards Britain; are the circumstances in which she is placed equally felicitous and independent? Alas! pent up in the confines of a narrow isle—and with an overteeming population which has reached the “*limit*,”—we postpone what is essential to our social existence; what, alone, can adequately recruit our exhausted resources, and give bread and occupation to our idle poor. Moreover, we delay its adoption at a moment of unexampled need,—a crisis of national distress,—one which is shaking the very foundation of all that is vital in the institutions of the Kingdom.

We hope, however, that the country is now upon the threshold of a change, which will alike, commercially and politically, effect the most important benefits. During the last six months, rapid progress has been made in the world of Elemental Locomotion. Not, because during that time, many, or important, improvements have been effected in the practical detail: but because the power which has so long been gained, has at length been partially encouraged to develop itself. Several trips have been made within that period, under the auspices of parties of sufficient literary or scientific attainments to give *eclat* to them. Whilst constant, and, of late, almost daily aggressions have been made, in all quarters of the metropolis, upon the scepticism of the multitude at large. From these circumstances combined, that change of opinion is hourly maturing in which there will remain, we doubt not, as few moral as there are now physical impediments, in the way of the introduction of general

Inland Steam Conveyance on Turnpike Roads.

The "*Journal of Elemental Locomotion*," to which this Number is supplementary, brings down the general report of Steam Carriage experiments to the month of May last. We now proceed to give a cursory outline of what has been done subsequent to that date; beginning with the carriage of Sir Charles Dance. From the moment Messrs. Maudsley and Field, as mentioned in the 6th Number, took up the cause, its friends began to entertain sanguine hopes that their expectations of seeing Steam Transit introduced upon common roads, would soon be realized. Accordingly, after the carriage had undergone some alterations in the detail, and in particular, an improvement in the boiler, sufficient to induce Sir Charles and Mr. Field to take out a patent for the same, an experimental journey, to test the alterations, was made to Brighton, which shewed higher and more satisfactory results than any that had preceded it. The carriage started from the factory, Lambeth, on the 20th of September, with fifteen persons, and, exclusive of stoppages, completed the journey down, in five hours and a quarter. The following morning, it left the Gloucester Hotel, about half after ten o'clock, and returned to London, in four hours and fifty-nine minutes, without any failure of machinery, and passing on the road two of the light coaches which had started half an hour before it.

In the month of October, the success of this trip was further corroborated by the same carriage, plying for hire, between the office Wellington Street, Strand, and Greenwich. During this time, in the presence of multitudes of spectators, it ran about 250 miles, at the average rate of ten miles an hour, conveying about 336 passengers, without any accident or impediment whatsoever.

The success of these various trips, and the public attention which they attracted, at length forced the subject upon the at-

tention of the venerable President of the Institution of Civil Engineers: under his liberal and powerful support, the trip upon the Holyhead Road was arranged and accomplished, the Report of which terminates this article; and which we subjoin, rather as the finding, of a body of enlightened and competent judges, upon the merits of a principle, than of a single carriage. Out of this experiment has sprung "The London, Holyhead, and Liverpool Steam Coach and Road Company," now forming under the auspices of Mr. Telford; and, sincerely do we wish that his valuable life may be long spared, to witness that this, the last great work to which he has hitherto put his hand, will also be his noblest one.

Whether Sir Charles Dance's Carriage shall have the good fortune to bear away the prize, in the free competition which we doubt not will be granted by this Company to Patentees, we pretend not to say. The maxim—*Palmar qui meruit ferat*, is a just one, and in this case we trust it will be rigidly acted upon. At all events, however, with Sir Charles remains the merit, that the conviction, as to the practicability and economy of employing Steam conveyance upon turnpike roads, has been arrived at, through his carriage. Nor can we omit the opportunity which the mention of his name affords, to add, that his assiduous and unremitting attention for years, to bring this great discovery to the degree it has reached, gives him a large claim indeed upon the gratitude of his country.—A merit which is not lessened, because it is shared by the other enterprising individuals whose labours in the same good field we now, in turn, proceed to notice.

Next in time, though perhaps not second in merit, is the Steam Carriage of Mr. Walter Hancock. The trips which this patentee has made to Windsor, with the "Era," to Stratford, Islington and Brighton, with the "Infant," have long been before the public. Early in May last, his steam omnibus, the "Enterprise," plied success-

fully, for hire, for three weeks between the City and Paddington; running, without accident, during that period several times daily, and carrying numerous passengers; but for motives best known to the parties to whose management it was confided, it has remained inactive from that time.

During the following three months Mr. Hancock's Carriage made various trips in the vicinity of London, affording results of a very satisfactory nature. Upon the 11th of September he visited Brighton, with his new vehicle, the "Autopsy," and remained for two days, for the purpose of gratifying the inhabitants by running it about. The journeys to and from were performed with much success. He has since invented a mechanical contrivance to prevent the formation of clinkers on the bars, which may be considered one of the greatest advances towards perfection in steam locomotion. In October, the "Autopsy" commenced running for hire, between Finsbury Square and Pentonville, and continued its performances daily for three weeks, with the exception of one day, when it was withdrawn in consequence of a deprivation in the supply of water. The machinery had all stood exceedingly well with the exception of one of the pistons which had given way. From Mr. Hancock's personal attention being required in his factory, he has deemed it prudent to withdraw the "Autopsy" from the road, after it has thus fully established its character by its successful performances.

The average number of daily trips which the "Autopsy" made from Finsbury Square to Pentonville and back was four, sometimes six, just as time permitted. It will again be brought upon the road from the City to Paddington early in the ensuing spring, along with two others, which Mr. H. is now building.

Colonel Macerone's and Mr. Squire's Steam carriage, in the opinion of the patentees, and of many who have examined it, is the most perfect one that has appeared. The boiler is of such a construction as to

render injurious accidents impossible, whilst the machinery is of so compact and simple a nature, that the carriage, according to Col. M., (who has lately published a pamphlet upon the subject, to which we are indebted for these particulars,) has run 1700 miles, with scarcely a single shilling being required for repairs either of the machinery or boiler.

The Carriage, carrying eleven persons, weighs about $3\frac{1}{2}$ tons. The engine is generally worked at the pressure of 150 lbs. to the square inch. The machinery, except the boiler and fire-place, which are behind the chariot, is placed horizontally, beneath the carriage, and within a strong frame of wood-work. The size of the whole is not greater than that of an omnibus; and the carriage is capable of being made ornamental. The motion is easy and agreeable—luxury compared with that of a city omnibus. The speed varies from ten to fourteen miles per hour. There is no smoke, nor any escape of steam, nor does the noise exceed that of a common cart when rapidly driven. The precision of regulating the speed, of turning, of stopping is infinitely greater than the most accomplished whip could attain in driving a one-horse chaise.

The cost of working this Steam-carriage, which is capable of carrying many more passengers besides luggage, than a four-horse stage-coach, is three pence or four pence per mile; that of a four-horse stage coach at least three shillings. The coke required to go to Windsor and back (48 miles) did not amount to five sacks; which, at the retail price of two shillings per sack, comes to ten shillings.

This carriage has repeatedly run five miles out, and five home, either on the Harrow or the Edgware road, and both are hilly, in forty minutes. It has also repeatedly run two miles in six minutes; and the three miles which include the Windmill, and another little hill beyond Kilburn, in ten minutes. It has gone from Paddington Green to Edgware, seven miles

and a half, at the rate of sixteen miles an hour. And to Windsor, including stoppages, in two. During the last month it has been making almost daily trips to Edgeware, upon which road there are two smart hills, to Harrow on the Hill, Stanmore, Watford, &c.; going over the hills, though they were in a very bad state, new gravelled and sloppy, at the rate of seven miles per hour.

An account of the experimental journey made by Messrs. Ogle and Summers, in their Steam carriage, last year, from Southampton to Liverpool, and thence to London,—the longest, and, on many accounts, the most arduous one ever attempted,—is given in the 4th number of the *Journal of Elemental Locomotion*. During the last summer the carriage has been in London, and has been making various short excursions for the purpose of proving the efficiency of its power.

The Steam Carriage of Messrs. Heaton, of Birmingham, has also, during the last twelve months, made many satisfactory performances. The patent was taken out the same year (1826) with those of Gurney and Hancock. Various improvements have been made since. Its average rate of travelling is from eight to ten miles an hour; and this it performs with great safety and certainty along all sorts of roads.

Aberdeen is the only town in Scotland which has distinguished itself in the cause of elemental locomotion. During the last summer, Messrs. Clarke, Gordon, and Macombie, with a few other enterprising gentlemen, have constructed a Steam Carriage which promises shortly to arrive at great maturity. A few months ago it made its first experimental trip, and ran a short distance into the country and back again. "Since the moment," says the *Aberdeen Journal*, speaking of this steam carriage, "we have seen the mighty power of steam, taught with equal facility to wing our ships through the raging sea, and to embroider the borders of our ladies' caps, we have

not for a moment doubted but British genius would triumph over the obstacles with which its application is beset, as a moving power on our common roads. In the present instance we noticed, as strikingly ingenious and beautiful, the application of the vibrating cylinders, the universal joints in the steam pipe and power axle, the simple and efficient substitute for the slide valve, and the vast facilities which the boiler affords for generating steam, combined with the most perfect safety. Difficulties may be of course anticipated in the perfecting of this, as of every other invention; we, however, see no reason to doubt but its performance will equal the anticipation of its spirited projectors." We shall have occasion to speak more fully of this carriage upon a future occasion.

In addition to these Steam Carriages, which, with that of Messrs. Gibbs, have all materially aided in demonstrating the practicability of Steam transit upon common roads, a number of patents have been taken out for carriages which have not, as yet, come before the public; such as those of Mr. Boaze, Mr. Joice, Dr. Harland, Mr. Holland, Dr. Church, Mr. Rich, M. Galy Cazalat (a French chemist), Mr. Redmond, Mr. James Frazer, and several others. But as it does not fall within the scope of this article to notice any, except such Carriages as have tested their machinery by actual experiment, we reserve our notice of these for our next number, hoping that, in the interval, the patentees will furnish us with the necessary information. A well digested comparative review of the mechanism and generators of Steam carriages will not fail to prove acceptable to our readers.

The question then as to the *practicability* being settled, we next come to the *expense* of working Steam Carriages upon Common Roads. Of course, upon this point, nothing definitively can be said. The data, hitherto afforded, are neither sufficiently numerous

nor decisive, to justify a final judgment as to the economy. Time and trial can alone furnish a correct estimate. Whatever the outlay now amounts to, the probability is, that it will bear a very high ratio, compared with what, eventually, will be required. Reduction of expenditure, and progress to perfection will go hand in hand. From the disbursements made in running the three principal Steam carriages, the

following calculations have been made. We are not responsible for their accuracy: the documents from which we copy them having being already published. The first is an estimate of the outlay and return, upon one of Mr. Hancock's Steam Omnibuses to run between the City and Pentonville or Islington, showing a clear gain, during a period of 365 days, of nearly cent. per cent.

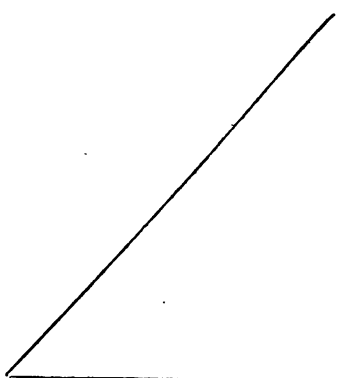
(Statement No. 1.)

CAPITAL REQUIRED TO BE INVESTED.

Cost of steam-carriage.....	£700
Spare ditto for use, when the other is under repair.....	700
	<hr/>
	£1,400
	<hr/>

Dr.	£.
Wages—engineer, 40s. per week, steersman, 30s. assistant 20s....	234
Repairs	150
Tolls 4d. each journey, $\times 12 \times 365$..	73
Coke 6d. per journey, $\times 12 \times 365$...	109
Water	50
Rent of coach-office and coach-house	100
Clerk	50
Premium to the patentee, at the rate (say of 1d. per passenger) 12×24 $\times 365$	438
Reserve Fund to replace carriage when worn out—probably in three or four years.....	175
	<hr/>
	1,452
Dividend of £84 on £1,400.....	1,176
	<hr/>
	£2,628

Cr.	£.
By twelve journeys per day, and twelve passengers each way, at 6d. each, $12 \times 24 \times 365$	2,628
	<hr/>
	£2,628



The second is an estimate of the comparative cost of animate and inanimate conveyance by Colonel Macerone, showing even a higher profit upon the capital employed.

(Statement No. 2.)

"Calculation as to the relative Expense of Horse and Steam Power, for Locomotion, on 100 Miles of Common Road, per day, for the 313 working days in the year."

HORSE POWER.		STEAM POWER.	
	£. s.		£. s.
Outlay for three coaches.....	600 0	Outlay for three steam carriages	2200 0
Outlay for 100 coaches.....	3500 0	Wear and tear of ditto.....	100 0
Wear and tear of ditto, per ann.	500 0	Fuel,* half a bushel per mile, at	
Keep, shoeing, attendance, and		6d. per bushel.....	391 5
harness, at £15 per day, for		Duty—exempted by Act of Par-	
horses	4695 0	liament.....	0 0
Duty to Government at 3d. per		Turnpikes, at 2d. per mile.	255 10
mile, i. e. 25s. per day for 313		Expenses of coke, water stations,	
days.....	391 5	attendants, &c. &c.	500 0
Turnpikes, at 2d. per mile.....	255 10		<u>£3346 15</u>
	<u>£9941 15</u>		
Two coachmen and two guards,		Two steerers, and two stokers,	
at 6s. per day each.....	875 1	at 6s. a day each.....	375 1
	<u>£10,816 16</u>		<u>£3721 16</u>
Difference per ann. in favour of			
steam, in 100 miles	£6595 0		

The third is from the prospectus of the "London, Holyhead, and Liverpool Steam Coach and Road Company," deduced from calculations of the extreme prices which might, by any possibility, be demanded and

paid for the various items, corroborated by offers of the most respectable tradesmen and manufacturers, as to the terms upon which they would be willing to contract for the supply of the article required.

* This is at the London retail price of coke. In Birmingham, Manchester, &c. the price is less than one half; so that it would cost only three half pence.

(Statement No. 3.)

"An Estimate for the Improvement of the Road, and the Establishment of Steam Carriage Conveyances between London and Birmingham."

ORIGINAL OUTLAY.

	£.	s.	d.
Parliamentary and other preliminary Expenses...	5,000	0	0
Road-making.....	300,000	0	0
Depôts and Water Stations.....	2,400	0	0
Engines.....	31,500	0	0
Contingencies.....	11,000	0	0
	<u>£350,000</u>	<u>0</u>	<u>0</u>

DAILY EXPENDITURE.

	£.	s.	d.
Hire of 30 Carriages, to run 100 miles each, at 1d. per mile.....	13	10	0
30 Engines kept in repair, at 6d. per mile each.....	81	0	0
Coke for 30. engines, 3 qrs. of a bushel per mile each, at 7d. per bushel.....	70	17	6
Engineer, Assistant Engineer, and Fireman, for 30 engines, 18s. each.....	27	0	0
Establishment at London, Bir- mingham, and the Depôt,.....	10	0	0
Reserved fund, for the pur- chase of new engines, equal to 10 per cent. per annum on the original cost.....	8	15	0
	<u>211</u>	<u>2</u>	<u>6</u>
Tolls payable to Trustees, at 40s. each engine.....	60	0	0
Interest and profit equal to £10 per cent. per annum on ca- pital of £350,000, and £30 per mile per annum, for the repair of the road, to be se- cured by an additional toll on Steam Carriages.....	104	15	0
Total daily charge	<u>£375</u>	<u>17</u>	<u>6</u>

RETURN.

	£.	s.	d.
150 Daily Passengers, at 23s. each.....	172	10	0
350 Daily Passengers, at 13s. each.....	227	10	0
N.B. The average number of passengers travelling daily, between London and Bir- mingham, <i>exclusive of the intermediate stages</i> , is 550, and the present coach fares are 40s. inside, and 20s. outside.			
Parcels.....	80	0	0
Daily Return	480	0	0
Deduct daily charge.....	375	17	6
Daily Surplus, after paying Interest and all Charges...	£104	2	6

(Statement No. 4.)

STATEMENT shewing the cost and profit of 61 stage coaches from London to Birmingham, calculated to carry, according to the estimated scale of the Railway Company, on the average nine passengers daily, exclusive of the intermediate stages, each coach travelling 108 miles per day.

Capital.

Horses, 3,050, averaging 30 <i>l.</i> each	£91,500
Coaches, 61, at 140 <i>l.</i> each	8,540
Contingencies, about 20 per cent. say	19,960
	<u>£120,000</u>

Income.

Passengers inside 122 daily, or 44,530 per annum, at 40 <i>s.</i> each ...	£89,060
Ditto outside 428 " 156,220 " " 20 <i>s.</i> each ...	156,220
Total	<u>550</u>
	<u>£245,280</u>

Coach Expenses.

Duty on 2,404,620 miles, at 3 <i>d.</i> per mile	£30,057	15 <i>s.</i>
Tolls about one-twelfth less	27,552	19
Hire of 61 coaches at 1½ <i>d.</i> per mile	12,524	1
Servants at 130 <i>l.</i> each coach	7,930	0
Taxes at 10 <i>l.</i> each coach	610	0
	<u>78,674</u>	<u>15</u>
	£166,605	5
Add for parcels in 22,265 journeys, at 40 <i>s.</i> per cent.	44,530	0
Ditto for bookings and portorage 3 per cent.	3,000	0
	<u>£214,135</u>	<u>5</u>

Horse Expenses.

Keep, farriers, harness, and attendance of 3,050 horses, at 50 <i>l.</i> per annum each	£152,500	
Loss by wear and tear, say $\frac{1}{4}$ of 91,500 <i>l.</i>	22,875	
Rent of stables, offices, &c.	8,000	
Management, 5 per cent.	6,000	
Contingencies 10 per cent.	12,000	
	<hr/>	
		201,375
		<hr/>
Total gross profit 10½ per cent.	£12,760	6

That this profit may be received as the general averaged profit, is supported by the fact, resulting from our own investigation of the averaged earnings of one of the largest and best conducted stage-coach establishments in the kingdom for a long series of years, including several losing coaches, shewing nearly the same profit.

We subjoin as a general inference from the whole preceding calculations, the following statement, shewing the estimated cost and profit upon steam coaches upon the turnpike line as it now is, for the same scale of work, as estimated in No. 4, allowing only for greater dispatch and economy, a greater averaged number of passengers daily to each coach, shewing, that 40 coaches actually in use, will do the work of 61, with more than 10 times greater profit, even after the fares are reduced 43 and 35 per cent.

Capital.

Steam Carriages, 60 at 700 <i>l.</i> each	£42,000
Contingencies	5,000
	<hr/> £47,000

Income.

Passengers inside 122 daily, or 44,530 per annum, at 23 <i>s.</i> each	£51,209 10
Ditto outside 428 „ 156,220 „ „ 13 <i>s.</i> each	101,543 0
Total .. 550	
Add for parcels in 18,250 journeys, at 40 <i>s.</i> each	36,500 0
	<hr/> £189,252 10

Expenses.

Hire of 40 steam carriages to run 108 miles each, or 1,576,800 miles, at 1 <i>d.</i> per mile	£6,570 0
Tolls payable to trustees at 40 <i>s.</i> per engine duty	29,200 0
Forty engines kept in repair at 6 <i>d.</i> per mile each	39,420 0
Coke for 40 engines, three quarters of a bushel per mile each, at 7 <i>d.</i> per bushel	34,492 10
Engineer, assistant engineer, and fireman, for 40 en- gines, at 18 <i>s.</i> each per day	13,140 0
Establishment at London, Birmingham, and depôts .	5,000 0
Reserved fund for the purchase of new engines, equal to 10 per cent. per annum	4,000 0
Contingencies, 20 per cent.	8,000 0
	<hr/> 139,822 10
Total gross profit about 105 per cent.	<hr/> £49,430 0

✂ But observe, no allowance is made for a greater trade in passengers, which of course will attend a cheaper, quicker, and more comfortable system of conveyance, though the same will add very considerably to the gross profit, on which account alone, the railway companies have doubled the actual revenue in their coach department, whilst the total income in No. 4 is reduced as above, in the ratio of 43 and 35 per cent.

We now terminate this article by copying of the Committee of Civil Engineers, who the most important Document which has accompanied the experimental trip lately yet appeared upon the subject : the Report made to Stoney Stratford.

" Report of the Result of an Experimental Journey upon the Mail Coach Line of the Holyhead Road, in Lieutenant Col. Sir Charles Dance's Steam Carriage, on the 1st November, 1833.

" Public attention having been attracted to the practicability of travelling with locomotive engines upon ordinary turnpike roads, by a report of a Committee of the House of Commons, of the 12th of October, 1831, stating that, in the opinion of the Committee, the practicability of such mode of travelling had been fully established ; and more recently by a report of a journey to and from Brighton having been successfully performed by Lieutenant Colonel Sir Charles Dance's steam carriage, as well as by the fact that the same carriage was daily in use between London and Greenwich, conveying numerous passengers through the crowded suburbs of the metropolis without the slightest inconvenience to the public, we were desirous of personally making an experiment of the facility with which a carriage of that description could perform a journey of considerable length : and having selected the mail-coach line of the Holyhead road for the purpose of such experiment, we made an arrangement with Sir Charles Dance for the use of his carriage, on Friday, the 1st inst.

Tons. Cwt.

- | | | |
|---|---|----|
| * The weight of the carriage, with the water, coke, and 3 persons upon it, was about | 3 | 5 |
| * The weight of the omnibus coach attached to it. | 1 | 0 |
| * The weight of the passengers, their luggage, and some additional sacks of coke, about | 1 | 15 |
| * Making the gross weight moved. | 6 | 0 |
| * The motive power was an engine with two cylinders, seven inches in diame- | | |

ter and sixteen inches stroke. The pressure of steam on the tubes constituting the boiler or generator, was not allowed to exceed 100lbs. per square inch.

" Before the carriage proceeded six miles, one of the tubes of which Sir Charles Dance's boiler is composed, was found to leak so fast as to render repair absolutely necessary : it was also apparent, that the size of the engine was not sufficient to carry so great a weight along a heavy road at any high velocity.

" The weather was by no means favourable, there having been much rain in the course of the night and morning, so as to make the road heavy, added to which the winter coating of new materials had, in many places, been laid upon the road. Notwithstanding these obstacles, upon our arrival at Stoney Stratford, 52½ miles from town, it was found by Messrs. Macneill and Carpmael, who had taken accurate minutes of the loss of time occasioned by stoppages, that the average rate of travelling had been seven miles per hour.

" Thus there can be no doubt, that with a well constructed engine of greater power, a Steam carriage conveyance between London and Birmingham, at a velocity unattainable by horses, and limited only by safety, might be maintained ; and it is our conviction that such a project might be undertaken with great advantage to the public, more particularly if, as might obviously be the case, without interfering with the general use of the road, a portion of it were to be prepared and kept in a state most suitable for travelling in locomotive steam-carriages.

* These facts have been ascertained by Messrs. Field, Macneill and Gordon.

"THOMAS TELFORD, President of the Society of Civil Engineers.

JOHN RICKMAN, Secretary and Commissioner of Highland Roads and Bridges.

C. W. PASLEY, Lieut. Colonel Commanding the Royal Engineers, Chatham.

BRYAN DONKIN, Civil Engineer.

TIMOTHY BRAMAH, Civil Engineer.

JOHN THOMAS, Civil Engineer.

JOSHUA FIELD, Civil Engineer.

JOHN MACNEILL, Engineer to the Holyhead Roads.

ALEXANDER GORDON, Civil Engineer.

WM. CARPMAEL, Civil Engineer.

J. SIMPSON, Engineer to the Chelsea Water Works."

List of Steam Coaches and Drags now Building and Built in London and its Vicinity.

Hancock	..... 1	Infant, his own, built, experimental one.
Ditto	..... 2	Era, (for a company) built.
Ditto	..... 3	Enterprise, (for a company) built.
Ditto	..... 4	Autopsy, his own, built.
Ditto	..... 5	a new one now building, his own.
Gurney, Stone, Gibbs and } Maudsley	..... } 1	{ a drag, built and altered by the said engineers, for Sir Charles Dance, knt.
Ogle	..... 1	a carriage, his own, built, experimental one.
Squire	..... 1	a carriage, himself and others, experimental one.
Fraser	..... 1	a carriage, himself & others, building, experimental one.
Gibbs and Applegath	..... 1	a drag, themselves, experimental one, built.
Gasfield and Bower	..... 1	a drag, themselves, experimental one, building.
Andrew Smith	..... 1	a drag (for Mr. King), experimental one, building.
Palmer	..... 1	a drag, his own, experimental one, built.
Redmund	..... 1	a carriage, experimental one, building.
Manting, Joseph	..... 1	a carriage, his own, experimental one, building.
Phillips and Co.	..... 1	a carriage, their own, experimental one, building.
Silk	..... 1	a carriage, his own, experimental one, building.
Smith and Co.	..... 1	a carriage (for a company), experimental one, building.
Mile End (name not known)	1	a carriage (for a company), experimental one, building.

PROPOSAL FOR APPROPRIATING,

For the use of the Public Purse, the vast Revenue that will arise annually from Inland Elemental Transit: with copy of Memorial submitted to Earl Grey for that object.

Had the social condition of the country been different from what it is—the project which I advocate less extensive—or the conditions upon which Ministers accepted office been otherwise than those of reform, retrenchment, and the common good, the suggestion propounded in the title of this article might well have been deemed a fool-hardy one. As it is, I feel encouraged to come forward under the auspices of a

Government that proposes to rule by the people, FOR THE PEOPLE, to submit a plan by which, I believe, all classes of the community, with mutual protection, will be mutually benefited. Should I, notwithstanding, as an individual, incur the imputation of rashly obtruding a proposal which many may deem to be a direct infringement upon all antecedent established principle in our social policy, I reply that

in the department of our domestic legislature I recognize that alone to be principle which provides that the welfare of the majority shall in all cases be the determining criterion.

If this reason be inconclusive—which I think coincides with the aim, and, I hope, the end, of those entrusted with the heavy responsibility of carrying on the administration of affairs—my second position in advocating the adoption of this suggestion is, that it is *essential to the existence of our present social system*. The distress of the country during the last eighteen years of peace has been gradually increasing: and what it now is, no man not totally blind to the course of events can possibly be uninformed of. We have Political Associations, Trades' Unions, and anti-social Societies, ramified over the whole face of the country. We have a million of operatives banded together under self-imposed oaths and obligations, and in possession of funds almost incredible,* about to dictate to their employers terms wholly incompatible with the welfare of either. I do not stop to enquire whether such proceedings may be arrested, or how they may terminate. An English coercion bill some may consider a sovereign panacea. I simply state the fact,—and leave it to my readers to deduce the inference,—that in every town, and village, and district, in the realm, we have masters ranged against their workmen, and workmen ranged against their masters! Reckless animosity, universal destitution, and seditious principles, are the order of the day. Mutual distrust, mutual discontent, mutual dislike, pervade our entire industrial communities. Each petty section is banded against its neighbour. Each large division at war with the mass. We have

Tory leagued against Whig, and Destructive against Conservative: the agriculturist against the manufacturer—the employed against the employer. In a word, by increasing poor-rates, and decreasing revenue, WANT, daily growing by what it feeds on, threatens in the prophetic language of an honourable member, “*SOME GREAT, SOME SUDDEN, AND SOME AWFUL CHANGE.*” How such a catastrophe is to be avoided unless by the adoption of a gigantic project which AT HOME shall cheapen food, and make labour abundant, I leave such as differ with me to determine.

Were either of these reasons insufficient for my presuming to bring forward this suggestion, I have a third no less conclusive, viz. the *magnitude* of the project: the universality, if I may so speak, of the impulse which its introduction will give to every department of manual industry. Elementary power applied to economic purposes, i. e. to the removal of *brute* labour,—is the mightiest possibility which human ingenuity has ever compassed. In regard to physical purposes, to which alone it has hitherto been directed, what has it not done in the industrial world—extended further to economic, what will it not do in the social? The former was but a boon in part, abridging human employment, and multiplying production. The latter will prove a boon in whole. enlarging human employment, and multiplying consumption. Steam as yet has made only goods—steam can now also make a market. The master genius whose discovery illustrates the eighteenth century as much as Columbus's does the fifteenth, did not in revolving all its multiform operations perhaps ever contemplate it in its highest development of all. Mind achieved its noblest triumph, when Gurney falsified all antecedent supposition by demonstrating experimentally, that it needs no longer be limited exclusively to the accommodating of matter to the use and the comfort of man; but that it can also direct what is a substance impalpable as the

* What these are may be guessed at from the fact, that the sum collected by the Building Union of London alone, in four months, amounted to 70,000*l.* During the same period what has the Aristocracy of England subscribed towards the removal of the distress of the lower orders which is now assuming so threatening an appearance?

breath of heaven to purposes that can feed the hungry, clothe the naked, give work to the idle, restore the energies of exhausted Britain, and bid her in renovated splendour, and renewed youth, walk on unobnoxious to that inherent decay which has undermined successively all the extinct monar-

chies of the past, and bid her rival upon the petty surface of our sceptered Isle, the limitless domain of her once Western world.

As the MEMORIAL following is sufficiently explanatory of my views, I shall, without further preface, submit it.

To the Right Hon. Earl GREY, K. G. first Lord of the Treasury, &c. and to the other the Right Honourable the Ministers of the Crown.

THE MEMORIAL OF R. BROWN, Esq.

HUMBLY SHEWETH,

That the application of Steam to the propulsion of Carriages upon common roads was, in 1831, by a Committee of the House of Commons, declared "practical,"—"safe,"—"one of the greatest improvements in the mode of internal conveyance ever introduced,"—"and "entitled to legislative protection."

That, since the above period it has been so much improved as to be now fit for immediate and general introduction; and, for that purpose several large joint-stock companies are upon the eve of being formed.

That, allowing the continuance of the present mode of conveyance during the next twelve years, there would be expended 70,000,000*l.* sterling upon the purchase and keep of the horses exclusively employed in stage-coach conveyance: which sum, yielding a profit under 9*l.* per cent., is unproductively sunk upon a species of live, food-consuming machinery, put together by no human labour whatever.

That, in the same period, Steam conveyance would vest the said 70,000,000*l.* in machinery, both fabricated, and put in motion, by human labour; and which would, after reducing fares, and paying all other expenses, yield a clear profit of upwards of 50 per cent. upon the capital embarked.*

That, this return is merely an item of the immense profit that will arise yearly by the extension of Steam to general land

conveyance and husbandry, from the general suppression of that animate brute machinery in the purchase of which is sunk a fluctuating capital of about 30,000,000*l.* sterling, and in its keep about 40,000,000*l.* annually.

That, the increase of travelling which will follow a cheaper and quicker mode of conveyance, and the removal of the cause which has kept up the price of provisions to an extent that has unbalanced consumption and production, abridged human industry, and shaken the tranquillity of the country, will produce a new annual revenue from five to eight millions, as the substitution is gradually introduced.†

That, the distress of the nation is now such that it can no longer pay the necessary taxation: whilst the reduction of the latter from the curtailment of State expenditure is only adding to the evil, by the embarrassment consequent on abridged consumption.

That, the only effectual, safe, and extensive, method of remedying the distress of the nation, is to reduce taxation by means which will relieve the people without reducing State expenditure.

That, the system which has hitherto prevailed, of Government allowing individuals

* Calculations made from data, which warrant the accuracy of these statements, have been prepared for the inspection of Government.

† From the data obtained from running his Steam Carriage nearly 2,000 miles, Colonel Macerone calculates that the annual expense of working a Horse Coach upon 100 miles, amounts to 10,000*l.*—a Steam one to 3,000*l.* If such is the profit on 100 miles, what will 24,531, the extent of turnpike roads in Great Britain, give?

to reap the enormous wealth which new inventions have produced, has been highly detrimental to public wealth, industry, and contentment.

That, the appropriation by Government of new inventions is not a monopoly for government, but a monopoly FOR THE PEOPLE: whereas, their being left to private enterprise, is making them the monopoly of stock-jobbers, fundholders, and capitalists; a monopoly, hitherto fostered by Government to the injury and impoverishment of nine-tenths of the community; and which has created a degree of jealousy and animosity between the poor and the rich, that has now attained a height threatening alike the peace and the order of society.

That, as the time is come when the people can no longer sustain the present taxation—so also is the time come when Government should not allow private monopolists to pursue a system so pernicious.

That, besides the direct advantages to arise to the nation at large from Government making Steam Transport and Husbandry a government measure, and a new source of revenue,—which the situation

of public affairs makes alike politic and imperative,—there are collateral advantages to arise from the appropriation which render it highly judicious and desirable.

1. It will insure the introduction of a project, which, with protection to our landed interests, will cheapen food, and afford abundant employment for our redundant poor, with the speed, and to the extent, which our exigencies require.

2. It will provide effectually for the public safety, which infallibly will be endangered if the introduction be left to the competition of rival companies.

3. It will greatly and judiciously extend the patronage of the crown; without compromising the rights of the subject.

4. It will, at a moment when “A RESTLESS SPIRIT OF DISCONTENT IS ABROAD,” arm in the Government pay with the pickaxe and spade, instead of the bayonet and sword, thousands of those who are now idle and disaffected in every district of the kingdom.

5. It will progressively admit of the extinction, not *conversion* of taxation.

6. It will diffuse public wealth, with public benefit, and public satisfaction.

WHEREFORE may it please the Right Honourable the Earl Grey, and the other the Right Honourable the Ministers of the Crown, to appropriate the profits of an invention which will shortly change the entire social economy of society, and eventually double the wealth, population and happiness of the United Kingdom, *for national purposes*: and further as preparatory to this step, nominate from the Provisional Committee* of the “Institution of Locomotion,” (a Prospectus of which is subjoined) a Board of Commissioners, including your memorialist, to collect every information relative to the state of general Road Conveyance, and the effect likely to be produced by the substitution of Steam for Horse power; and to report in what manner the Revenue to arise from the same can be best appropriated for the good of the nation at large.

And your Memorialist will ever pray, &c.

R. BROWN.

This MEMORIAL was transmitted to Earl Grey, upon the third of last month, accompanied by the following letter.

* See the Provisional Committee, following Article.

MY LORD,

The progress of Elemental Locomotion has at length reached a degree of perfection which will admit of the immediate application of Steam to economic purposes. The country stands therefore upon the eve of the greatest change that mechanical science has ever accomplished.

The moment has arrived in which your Lordship, as the head of the Administration, has it in your power to adopt a measure which will prove adequate to restore the peace, harmony, and prosperity of society.

I leave the accompanying Memorial to be supported by the merit of its subject: convinced that in the present posture of affairs, the proposal made is the most important one ever submitted to the attention of Government.

At the present moment the appropriation suggested in the Memorial interferes with no private or co-partnery rights: but its immediate adoption is necessary to anticipate the formation of the numerous companies now in contemplation.

MY LORD,

I have the honour to be,
With great respect,
Your Lordship's

Most obedient humble servant,

The Rt. Hon. R. BROWN.
Earl Grey, K.G. &c. London, Nov. 3, 1833.

Not having been honoured with a reply, and uncertain whether it had reached its destination, I enclosed a copy of it upon the 26th ultimo to the Lord Chancellor, together with the following letter:

MY LORD,

I beg leave to request your Lordship's attention to the enclosed Memorial which was transmitted three weeks ago to Earl Grey, but to which I have not as yet had the honour of a reply, in the hope that the adoption of a suggestion which will in so many important respects improve the social condition of society, will owe to your Lordship that protection and support

which you have always been pleased to extend to whatever consults the domestic prosperity of the great body of your countrymen.

My Lord, I need not, at a moment when unbalanced consumption and production is the grand evil of our industrial condition, enter into an argument to shew that reduction of State expenditure is only an increase of the evil which it is intended to remedy. Neither, under the difficulties in which all classes find themselves, is it presumptuous for me to add, that taxation to effect relief must be taken off to an extent which will prove embarrassing to Government.

Thus situated, and considering that the domestic policy of the past, (viz. the non-interference on the part of Government with what has falsely been called the enterprise of the country) has ended in dividing the nation into usurers and paupers, is it not wisdom to retrace our steps, and make the power which the progress of art and science has furnished us with, available for purposes that will bless and better the condition of the millions, and not merely a few of the units?

Considering how the introduction of the great project, contemplated in the enclosed Prospectus, will meet the cry now raised for CHEAP BREAD in a way that will restore the prosperity of our depressed agriculturists; and, together with putting our manufacturers on the same footing with their continental competitors, furnish a new and extensive market at home:—further, how it will, by improving the iron and coal trades, increasing travelling, road-making, machinery, &c., advance the universal industry of the country, is it not a matter of sufficient magnitude to be entitled to the prompt furtherance of the Government?

My Lord, by calculations prepared for the inspection of Ministers (and which I should feel honoured in being allowed to submit to your Lordship) it appears, that, after paying all expenses, and reducing fares a half, about 50% per cent. will

be the clear profit which will arise from Steam conveyance upon the capital embarked. If Government then will borrow 10,000,000*l.* to put the project into practice, it will eventually reap for State purposes 5,000,000*l.* annually, and will be enabled to effect a commensurate reduction of taxation, without the present accompanying evil, curtailment of expenditure; and that in a way which will be attended by the most important political consequences as detailed in the Memorial.

Perhaps, my Lord, this proposal may, at first sight, be deemed preposterous:—but when you consider the different bearings of the project, the magnitude and variety of the changes which it will effect, and the pressing exigencies of our social condition, I feel confident that your Lordship's enlarged mind will see the propriety of Government appropriating it for the benefit of the State. When the late Mr. Palmer projected the conveyance of the mails by coaches, his plan, I am told, was regarded at first by the administration of the day, as folly, and rejected—with what wisdom, the event has shewn!—This project, though infinitely more important, may experience the same fate at the hands of the present Ministry: but it will eventually triumph, and become an immense engine of State policy. Science has never before conferred so important a boon upon man. If Ministers therefore will consolidate their rule in the most permanent and effectual manner, they will take advantage of the opportunity presented to make themselves the greatest benefactors of the nation. The application of Steam to economic purposes will restore domestic peace, plenty and prosperity; and the appropriation for the public service of the vast returns that will arise from it, must secure for the Administration that effects it, the gratitude and affection of the whole body of the people.

Since I had the honour to address Earl Grey upon this subject, the result of the Steam trip on the Birmingham road has so

thoroughly convinced Mr. Telford, and the other eminent engineers who accompanied him, of the practicability of running Steam Carriages upon common roads, that he is now occupied in getting up a company for the purpose. Last week, notice was given in the newspapers that a bill for this object will be brought forward next session. This great change, therefore and if Government adopts the suggestion made in the Memorial, it is important that it should anticipate the formation of the numerous Companies now in agitation, by opening a commission as prayed for, to consider the subject previously to the meeting of Parliament.

My Lord, the favourable reception which you were pleased to give to former applications upon this subject, and your recommendation of it to the attention of Lord Althorp, encourage me to hope that your Lordship will be pleased to give it your consideration and support. This, I presume to hope for the more confidently, as the prosperity of your fellow subjects has ever been the primary object of your Lordship's concern; and because I feel assured that a project equally important, whether commercially, morally, or politically considered, never before claimed the furtherance of your powerful protection and aid.

MY LORD, I have the honour to be,
with great respect, your Lordship's
most obedient, humble servant,

The Right Honorable R. BROWN.
Lord Brougham & Vaux, &c.

London, Nov. 28, 1832.

To neither of these communications have I received any answer. But as silence is considered assent in cases where assent is most solicited, I shall not deem it an unpropitious omen, in a matter which consults the well-being of twenty millions of people who are ready to perish.

In the trust, that in such a supposition I may not be mistaken, I shall now proceed shortly to submit, that perhaps the

best way for Government to take up this subject is to bring forward a consolidated Turnpike and Steam-Coach Bill, with power to invest such capital as shall be necessary to introduce Steam, or elemental, transit, as expeditiously as possible, upon all the principal lines of the kingdom : so that the benefit of this improved means of conveyance may be equally and promptly shared without prejudice to any of our commercial interests. For this end, a Board of Commissioners, as prayed for in the MEMORIAL, with the Post Master General at their head, ought to be appointed : nor would it be injudicious to associate with the individuals alluded to, the parties who have first distinguished themselves by their spirited intention of bringing forward this project as a private Company. The names upon the Prospectus of "the London, Holyhead, and Liverpool Steam Coach and Road Company," are sufficient guarantees that a share in the management of this great undertaking could not possibly fall into better hands.

The only question which remains is, how shall the consummation of a project in every respect so devoutly to be wished, be best provided for ? In answering this important query, I hope that I shall do so with due regard to the dignity of the cause which I have undertaken to advocate. If Steam applied to economic purposes effect not a beneficial change in the whole social relations of our domestic society, the fault will not lie in the project, but in its mis-management.

There are two causes operating together to our national distress ; and both, though founded in mistaken national generosity, of the most destructive character—I mean, the *Poor Rates*, and reduction of *State expenditure*. Of the first, in the words of the motion made last session upon them, "their present administration is one main cause of whatever distress and immorality exists amongst the working classes." Of the second, at a moment when *consumption* is the grand desideratum, whatever re-

duces State expenditure only increases the evil which it is meant to remedy. Ministers felicitate themselves, that, since they came into office they have reduced the national expenditure from fifteen to twelve millions, and the way in which they have done this, may have been perfectly just, proper, and laudable. But what then ? as far as regards its being a relief of our distress, it is a perfect juggle. When increased expenditure is necessary to our existence as the air we breathe, it has been diminished by three millions ! It is true, this sum is not lost, but fructifying somewhere ; but it is not the less withdrawn from circulating in those channels which are left dry and barren without it. Now, I propose to bring about *THE CHANGE* which will amount to an *extinction of our distress*, not simply to a *conversion of it*—by turning these two perpetuating and multiplying causes of our pauperism to the direct purpose of its extinction.

Of the 8,255,315*l.* the amount of last year's Poor Rates, after making provision for the aged and infirm, we have an available surplus of upwards of 6,000,000*l.* which can be applied to the purpose of facilitating the application of Steam to transport and husbandry. Nor ought such an appropriation of them to be deemed misapplied, since it is to introduce a *change which will work out their extinction*. Whilst, if Government for the same purpose will borrow 10,000,000*l.* after reducing the expense of conveyance one half, providing effectually for the safe, speedy, and general introduction of the project, paying the interest, &c., it will have the clear enormous profit, amounting to some millions annually, for the purpose of cancelling taxation without curtailing national expenditure.

But what ! I think I hear the parish overseers exclaim, on the one hand, Would you really commit so unheard of a cruelty, as to administer the poor rates in the shape of an employment, that in a few years will reduce them to a state merely nominal ? and

on the other, the stock-jobbers, Would you actually have Government to interfere with the enterprise of the country? Yes, gentlemen, the country will survive were each of your occupations with schedule A, and the sooner they get there, the sooner will return peace and prosperity. Whether the poor rates shall be so applied, it remains for those who pay them to determine. But whether Government will appropriate the vast revenue arising from this great change, rests in the option of the British public. Hitherto, Government has avoided interfering with what has been falsely called *the enterprise of the country*; and what, pray, has this non-interference on their part brought us to? that is the criterion. Look abroad over the face of society, and, considering that Britain is the mistress of the world, the depository of the wealth of all lands, answer the question. If prosperity surround not every hearth, if peace and plenty and happiness be not the condition of every family, it is not because Government HAS EVER interfered with the enterprise of the country. If misery and discontent, hunger and nakedness, immorality and crime, appeal your sight, it is because Government NEVER HAS interfered with the enterprise of the country. "*Interfere not with the enterprise of the country,*" has been the slogan with which the fundholder, the stock-jobber, the bill-broker, the capitalist, and usurer, have gone forth to do battle against the well-being of the community. THE ENTERPRISE OF THE COUNTRY has been the veiled divinity whose idolatry has enfeebled the knees, and broken the heart, and bowed the energies of imperial England! Now, it is full time to do away with

this fatal thralldom of a name, this pseudo-liberality; and discover that stock-jobbing enterprise, fundholder enterprise, capitalist enterprise, is not NATIONAL ENTERPRISE. That alone is national enterprise which will cause it to be universal, not associate—the enterprise of the poor as well as of the wealthy, which will enrich the multitude, and also the individual—which in a word shall secure that the enormous profits yearly arising from this project shall, instead of going to swell the heaps of the units who are overgorged with wealth already, be substituted by Government for those taxes which must of necessity be taken off our impoverished millions. I lay my hand upon this matter in the name, and for the behoof of the suffering people of England. There is at present nothing in the way to prevent its retention, BUT THAT THE POPULAR WISH SHOULD BE UNEQUIVOCALLY SIGNIFIED.

I have brought my proposal, for which, whether it encounter a good or a bad report, I am individually responsible, unreservedly forward. And I now commit it to the enlightened suffrage of my countrymen; knowing that though it may appear to many to be like bread cast upon the waters, it will nevertheless be found after many days. If I succeed in this great object, I shall have reached the good which I proposed to myself when I commenced my labours,—the improvement of the social condition of my country. If I fail, the great body of my fellow subjects suffer along with me; and short therefore, I trust, will be the interval over which posterity in reference to it shall have to pour the sympathy of that dettractive reflection—"*O fortunati nimium sua si bona nosset!*"

PROCEEDINGS OF
THE NATIONAL INSTITUTION OF LOCOMOTION :

WITH PROSPECTUS OF

The Quarterly Journal of Steam Transport and Husbandry.

PROVISIONAL COMMITTEE.

HENRY HANDLEY, Esq. M. P. Chairman.

The Most Noble the Marquis of Sligo, K. P.
Right Hon. the Earl of Kerry, M.P.
Right Hon. Lord Viscount Sandon, M. P.
W. R. Keith Douglas, Esq., F.R.S.
Sir John S. Sebright, Bart., M. P.
Sir George Cayley, Bart., M. P.
Sir Andrew Agnew, Bart., M.P.
Sir James Broun, Baronet.
Sir Gerard N. Noel, Bart., M. P.
P. Maxwell Stewart, Esq., M. P.
C. Shaw Lefevre, Esq., M. P.
Edward Romilly, Esq., M. P.
C. D. O. Jephson, Esq., M. P.
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W. B. Baring, Esq., M. P.
J. H. H. Foley, Esq. M. P.
John Leech, Esq. M. P.
W. A. Mackinnon, Esq., F. R. S.
Samuel Anderson, Esq.

The Right Hon. the Earl of Kenmare.
Right Hon. Lord Viscount Morpeth, M.P.
Hon. Lord Oxmantown, M.P.
Sir Charles Lemon, Bart., M. P.
Sir Harry Verney, Bart., M. P.
Sir Coutts Trotter, Baronet.
Lieut.-Gen. Sir Thomas Browne, K. C. H.
Colonel Sir Henry Watson, K. T. S.
Major-General Charles Palmer, M. P.
Colonel Torrens, M. P.
J. S. Buckingham, Esq., M. P.
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John Browne, Esq., M. P.
John Hardy, Esq., M. P.
R. A. Slaney, Esq., M. P.
J. Wilson Patten, Esq., M. P.
Andrew Johnston, Esq., M. P.
William H. Hyett, Esq., M. P.
William Dundee, Esq.
R. Broun, Esq.

and Secretary.

TRUSTEES FOR DONATIONS.

W. R. Keith Douglas, Esq. | Sir A. Agnew, Bart., M. P. | H. Handley, Esq., M. P.

BANKERS.

Messrs. Coutts and Co.

In the third number of the "*Journal of Elemental Locomotion*," after reviewing the object proposed by the "Agricultural Em-

ployment Association," and showing that the good which it, and its coadjutors, "*The Land Allotment*," and "*Labourer's Friend*,"

Societies, produce, amounts at best only to a conversion of our distress—not to an extinction of it, we proceeded to shew, under the depressed condition of the lower orders, that any plan proposed for their benefit would utterly come short of effecting any thing better than a partial and temporary object, unless it be such as shall provide for the improvement of the employed classes *by and through the improvement of the employing classes.*

We afterwards proceeded to observe, that unhappily the distress which requires, and must find, relief, is not partial, but the condition of nine-tenths of our population; that the evil above all others which presses most severely upon all classes, is the high price of food; that this arises from the circumstance, that during the last quarter of a century the partial application of Steam to *physical* purposes only has abridged manual labour, and artificially increased and cheapened to a vast extent the *CONVENIENCES* of life, without being extended to *economic*—i. e. the removal of brute labour—purposes which would have admitted of that reduction of the *NECESSARIES* requisite to maintain the relative proportion between the price of provisions and the power of purchasing them, which is essential to a prosperous national condition. An evil which has been progressively increasing, until it has reached an extent which is now paralysing all commercial and agricultural transactions, fearfully increasing pauperism and crime, fomenting sedition, and threatening the best interests, civil and social, of society.

The mode by which we proposed to accomplish the joint purpose of benefitting the labouring classes, by benefitting their employers, was—and is—the extension of Steam to general economic purposes, which the progress of mechanical science has at length rendered practical. A mode which will economise the general resources of the country—accelerate inland commercial intercourse—raise cheap corn, with protection to our domestic agriculture—and open

up new, extensive, and permanent fields of human industry.

To carry effectually this Project into operation, and with the speed, and to the extent, which the exigencies of our distress requires, we suggested the formation of a *NATIONAL INSTITUTION OF LOCOMOTION*, unconnected with any trading company, to be composed of such noblemen and gentlemen as shall co-operate to patronise, and facilitate, the introduction of a measure which, whether viewed commercially, morally, or politically, will effect the most important changes in the social condition of society.

The same subject was farther advocated in the 5th number of the Journal, and in consequence of the suggestions thrown out, the Meeting of noblemen and gentlemen took place in Fendall's Hotel, Palace Yard, upon the 23rd of April last, which is recorded at length in the 6th number.—Henry Handley, Esq., one of the Members for Lincolnshire, whose exertions were greatly instrumental in bringing the parties together, and to whose liberal support we are chiefly indebted for making the progress we have done, took the Chair; and opened the proceedings, by stating his conviction “that Steam was the most mighty engine as yet confided to mortal hands—that its powers and resources has been hitherto but partially developed; and that he anticipates, ultimately, the greatest advantages to every class of society, from its application to the various purposes of Transport and Husbandry; adding, that were it probable, the application of such a power would tend to diminish the demand for manual labour, he for one would never become its advocate; however, on the contrary, he felt satisfied it would very materially encrease it, for by displacing animal power, it would effect an enormous saving in the food of man, and a reduction in the cost of cultivation,” &c.; after which, the following Resolutions were moved and unanimously carried:

1st. By Colonel TORRENS, M. P., se-

conded by J. W. CHILDERS, Esq., M.P.—“That the application of Steam to purposes of inland Transport and Husbandry will, by cheapening the production, and saving the consumption of the Food of the country, be accompanied by advantages to all classes of the community, of the most extensive and permanent utility; and that, as such, this Meeting considers it highly entitled to their support, and that of society at large.”

2nd. By C. SHAW LEFEVRE, Esq. M.P., seconded by W. R. KEITH DOUGLAS, Esq.—“That the practicability of applying Steam to general locomotive purposes, was satisfactorily proved by evidence before a Committee of the House of Commons, in 1831, who reported the same to be ‘practical,’ ‘safe,’ ‘one of the greatest improvements in the mode of internal conveyance ever introduced,’ and ‘entitled to legislative protection;’ and that, since that time, it has been further and fully established by numerous successful experiments.”

3rd. By LEONARD S. COXE, Esq. seconded by W. P. BARESTOCK, Esq. M.P.—“That this Meeting considers it desirable that an association be formed for bringing the measure forward in the prominent manner which its own importance, political and commercial, and the exigencies of society

require: to be called the INSTITUTION OF LOCOMOTION, for Promoting the Application of Steam to General Transport and Husbandry Purposes; and that the noblemen and gentlemen named above, with power to add to the same, do act as a Provisional Committee to carry the resolutions of this Meeting into immediate effect.”

After which, the thanks of the Meeting, moved by Sir Andrew Agnew, Bart. M.P. and seconded by Lieut.-General Sir Thomas Browne, was voted to Mr. Handley, for his conduct in the Chair, the attention he had bestowed upon the subject, and for the manner in which he had on this, and other occasions, laboured for its extension.

At an adjourned Meeting, upon the 28th of May, it was further resolved, as the most effectual mode of promoting the object contemplated: “That donations (to be paid into the house of Messrs. Coutts and Co. and to be under the management of the gentlemen above-named as trustees) be solicited, for the purpose of forming a FUND, out of which premiums may be offered, and other means taken, for the encouragement of Steam transport on common roads, and husbandry.”

Since the above meeting the following donations have been subscribed:—

	£.	s.		£.	s.
Most Noble the Marquis of Sligo	10	0	W. R. Keith Douglas, Esq.	10	0
Henry Handley, Esq. M. P.	10	0	Sir Andrew Agnew, Bart. M. P.	10	0
Right Hon. the Earl of Kerry, M.P.	10	0	S. C. Lefevre, Esq. M. P.	10	0
W. B. Baring, Esq. M. P.	10	0	Sir Gerard N. Noel, M. P.	10	0
Sir James Broun, Bart.	10	0	J. W. Childers, Esq. M. P.	10	0
C. D. O. Jephson, Esq. M. P.	10	0	J. Wilson Patten, Esq. M. P.	5	0
Sir George Cayley, Bart. M. P.	10	0	Colonel Page	10	0
Sir Coutts Trotter, Bart.	10	0	Lord Oxmantown, M. P.	10	0
Samuel Anderson, Esq.	5	0	J. H. H. Foley, Esq. M.P.	10	0

The names of various noblemen and gentlemen of influence have been since added to the Committee; and it is to be hoped, as the object which the Institution proposes becomes more widely known, and is better understood, that it will secure to itself the

patronage of the nobility and aristocracy at large, as well as of all who feel interested in patronizing the prosperity of their fellow subjects, and the best interests of their native land.

We have too long advocated the na-

tional advantages to arise from the application of Steam to the purposes mentioned, to require to dwell longer upon these topics here. They are sufficiently apparent to whoever will take the trouble to consider the project in all its various bearings. But to the leading article of this number we refer the landed reader, in proof of the necessity that Steam conveyance and Steam husbandry should be introduced together. Believing that the conclusion arrived at is warranted and accurate, we contemplate that this INSTITUTION, now in embryo, will become one of vast importance; and as a parent Metropolitan association be in connection with all the Agricultural Societies, Scientific bodies, and Locomotive Companies throughout the United Kingdom. In a word, that it shall eventually be for Great Britain and Ireland, more than what the Highland Society now is for Scotland. With this view, should the Donation Fund accumulate, as we anticipate,—and if the idea is taken up, want of means can form no drawback, considering the number and affluence of the associate interests over the whole kingdom who would form its contributors—there may arise out of it a Public Building appropriated to all purposes connected not only with artificial husbandry, and mechanical transit, whether upon land or water,—the most important certainly of all our domestic concerns,—but also with all others, whether of practical art, or science, which may be of general utility. A NATIONAL INSTITUTION OF LOCOMOTION, to be under the direction of a *Board of Management*, formed of noblemen and gentlemen distinguished for their desire to promote the internal prosperity of the country, having separate *Consulting Committees* of scientific individuals, of skilful practical agriculturists, of ingenious mechanics, engineers, &c. to preside over their respective departments, and furnish to the public information connected with them;—which would contain a spacious Hall where public meetings connected with agricultural affairs, steam-carriage com-

panies, or canal property, may be held, or lectures delivered;—together with a READING ROOM, to which parties interested in these objects may have free access, having a library attached of standard works upon these various important subjects, with periodicals, maps, designs, drawings, &c.;—and also a GALLERY for the exhibition of models of all engines, machines, implements, &c. connected with the same, would fill up a great desiderum, and could not fail to prove highly useful both to the interests concerned, and the public at large; independent of the accommodation which it would afford to the numerous country gentlemen, farmers, and other individuals who resort to London yearly upon business of this kind,—and the encouragement which it would give to inventors, patentees, projectors, &c.

There is a Society at Leipsic, and in other parts of the continent, founded partly upon this principle, where different Committees of art and science are appointed to take into consideration objects of national utility, and to provide the means for bringing them to completion. What object can be more beneficial than to concentrate the genius and science of the country under the auspices of one GRAND INSTITUTION, where people could see at a glance all that mind can devise, and ingenuity perfect, for the advancement of our social prosperity. For the want of such a patronizing Institution the energies of the enterprising are cramped and blighted, and the common interests of society retarded or destroyed. We have every day instances of the Committees of great undertakings falling into errors highly prejudicial to the prosperity of large branches of the community, solely because they are left at the mercy of interested engineers and speculators, whose representations they are incompetent to check. We refer to our second article in proof of the danger arising from such a condition, and ask the share-holders of the various projected rail-roads, what it would have been for their interests if there had

existed this Institution, with a Council of Engineers, whose opinion they could have taken before involving themselves in such heavy pecuniary responsibilities. On the other hand, how important to society an INSTITUTION which will stimulate the needy genius of the country. How often does it happen that the inventive mechanic has it not even in his power to purchase the tools with which to work out an idea floating in his mind that may prove of the utmost importance to the nation at large. Had such an INSTITUTION existed half a century ago in England, or America, to which projectors could have communicated their inventions, and from which they could have procured assistance, the ingenuity and talents of the great Fulton, and the no less illustrious Watt, would not have been lost for years to their country and kind, nor would they themselves have been distressed and unhappy schemers without friends or credit. Windsor, whose perseverance brought gas to light our cities, would not have died amidst the darkness of penury and neglect in a foreign land;—nor would the greatest undertaker of his age have deplored in exile at the Land's End, the want of that co-operation which, before this, with all its mighty benefits, would have artificially rolled the tide of human life, and the produce of human industry, through all the populous districts of the empire!

Having thrown out these ideas upon the subject of a NATIONAL INSTITUTION to embrace these important objects, we invite communications in the mean time from such noblemen and gentlemen as shall feel inclined to forward it.* After the assembling of Parliament we shall endeavour to get up a Public Meeting upon the subject, when it will be brought before society in a more prominent manner.

But should Government entertain the proposal made in the preceding Article,

* Letters, post-paid, to be addressed to THE SECRETARY FOR THE INSTITUTION OF LOCOMOTION, Mr. Mortimer's, Publisher, 2, Wigmore Street, Cavendish Square.

it will further, at this public meeting be suggested, in order to carry this great object into effect as quickly as possible, that it should be proposed to the SOCIETY OF ARTS, to unite with the PATRONS OF THE INSTITUTION OF LOCOMOTION, to consolidate the whole into one grand and magnificent undertaking for the better encouragement of the arts and working classes, and then conjointly to MEMORIALIZE THE CROWN to remove such of the public offices from Somerset House as would be more conveniently located for the dispatch of our revenue and naval operations nearer to the Treasury and Admiralty; thus affording to Ministers at this moment, when they are contemplating the consolidation of all the turnpike trusts, the means of concentrating, under their own auspices, the whole of the inland transport of the kingdom, similar to the policy so successfully practised by the government of France; and thereby converting not only a public edifice at present inconveniently appropriated, into one of the greatest and most useful national establishments in the universe,—but one which, by the blessing of God, is well calculated to generate benefits which cannot fail to give fresh life and energy to the genius and industry of the country, and to restore lasting peace and prosperity.

Granting, however, that the Government should object to the plan on the score of the outlay that would be necessary for building new offices, still when it is represented, that the funds of the Institution proposed to be established might be appropriated to that purpose, in lieu of erecting an edifice elsewhere; and considering how immensely the public good would be at stake, we cannot anticipate that the Crown would hesitate to go hand and hand with the promoters of an undertaking, so replete with national advantages of the most vital importance to the whole community.

Should any thing appear on the face of these suggestions extravagant, it should be born in mind that the removal of these

offices is no new suggestion, but has long been felt expedient for the better regulation of the public service.

We now come to the subject of "*The Quarterly Journal of Steam Transport and Husbandry*." The object having been accomplished which led to the commencement of "*The Journal of Elemental Locomotion*," viz. the formation of a Company for the introduction of Steam conveyance, and the claims upon the Editor's professional attention in consequence no longer affording him sufficient time to permit of his conducting it any farther, that periodical has ceased for some time to exist. But as we made its pages a vehicle for making our opinions upon this subject known to the public, as well as of laying in it the foundation of the INSTITUTION OF LOCOMOTION, which we have been the means of forming, we have, by Mr. Gordon's concurrence, brought out this number, which is intended merely to serve as a prospectus of our enlarged work, in the same form and type as the Journal. It will therefore, with the six numbers of that work, to which it is to be considered supplementary, form a volume corresponding in size to Mr. Gordon's Treatise upon the same subject*: and we hope it will be found a valuable report of all that has been done in this new department of mechanical science up to the present date†.

Preparatory to entering upon the enlarged sphere which now lies before us in "*The Quarterly Journal of Steam Transport and Husbandry*," it is necessary to state explicitly the objects proposed by this Periodical, and the means by which those who conduct it hope to be enabled to realize their intentions.

1st. THE OBJECT proposed by "*The Quarterly Journal of Steam Transport and Husbandry*," is in general terms to furnish the public periodically with whatever is connected with elementary locomotion,

whether upon land or water: to afford to patentees, inventors, projectors, &c. an opportunity of making public through an authentic channel, such discoveries as are intended to promote the comforts and interests of society as a whole. Under the head of Quarterly Report of Steam Transit on common roads—Canal and Steam Navigation—Artificial Husbandry, &c., will be brought forward information of a practical kind of the greatest utility to all classes of our readers: whilst a series of most important papers will be given upon our domestic, social, and foreign economy. At all times our pages will be open to collateral communications upon whatever questions affect the general prosperity of the nation; our object being to supply as far as possible a desiderum in periodical literature, viz. A JOURNAL EXCLUSIVELY DEVOTED TO THE IMPROVEMENT OF OUR SOCIAL CONDITION.

For this purpose we shall associate with ourselves in this undertaking the most eminent writers on those various departments of practical science which come within the scope of this publication: and in addition we invite communications from inventors, projectors, agriculturists, steam carriage patentees, and those interested in the improvement of navigation, whether internal or external. In doing so the parties, whose co-operation we thus solicit, may have full confidence that it is our purpose to use the information so procured for the advancement of those interests, not to abuse it. We stand perfectly aloof from all parties; we have no connection with any engineer, nor any body of speculators: our object is simply and directly to advance the public good;—and we shall pursue that end with a single and determined purpose.

In advocating a project which substantially shall provide remedies at home for most of those measures in our national policy which can neither be affected from abroad, nor yet by the methods now in agitation, without making evils worse than those which they propose to remedy, it is

* Published by B. Stuart, Cheapside.

† See notices of these Works by the public press at the end of this number.

impossible to separate it altogether from a political tendency. But limiting our remarks in this regard—not to men or parties but—to measures affecting the weal or woe of great masses of our fellow subjects, we shall endeavour to steer an onward course, with a single eye to order, prosperity, and peace. This we can do with all fearlessness, possessed of an intention *conscia sibi recti*;—and of a subject, the moral dignity of which we would consider to be prostituted to the basest treachery, did we not bear it as a two-edged weapon against whatever tends to foment that anarchy and civil convulsion which, under the good providence of God, we verily believed it commissioned to prevent.

Hitherto in opening up this new field of domestic economy we have had to theorize largely upon it: but now that we have accomplished so far the object which we had in view, viz. making the WILL necessary to bring the project into operation, it will be our object to confine ourselves chiefly to practical details. The subject is one of growing importance, and daily as it comes into operation will furnish information, the publication of which will be alike of great interest and utility.

To the Agricultural Classes in especial, who will assuredly, at no distant date, be forced to adopt Steam for many purposes connected with husbandry, should they not see the propriety of spontaneously adopting it,—and to the manufacturing classes, to whom foreign markets ought to be an object of very secondary importance compared with enlarged consumption at home, our pages will convey the most vital information. For we trust at no distant date that they will become the organ of an INSTITUTION, in direct communication with all the Agricultural Societies of the kingdom,* since it is intended to promote the

very same object which is proposed by the ANTI CORN-LAW SOCIETIES, now forming in all quarters, but with this most essential difference, that the means adopted by the one will preserve our domestic agriculture, the other destroy it.

2d. THE MEANS by which the conductors of "*The Quarterly Journal of Steam Transport and Husbandry*" hope to be enabled to realize their intentions. In commencing the periodical to which this is a concluding supplement, the writers had a higher object in view than any thing that could arise from its sale. Had it been otherwise, they would have lost their time, their trouble, and nearly the whole pecuniary outlay attending upon its publication. In coming forward, therefore, with a proposal for the new and enlarged periodical, to which this is introductory, we feel entitled to throw ourselves upon the support of those various, and wealthy, interests whose benefit is contemplated by its publication. The mere sale of a work, such as it is proposed this shall be, will not cover the actual expenses of getting it up. It is not like a periodical of floating literature, embracing reviews principally of works of imagination, which can be written *currante calamo*, without further research than what a family library can furnish; but, as several of the preceding articles testify, will combine information collected with great care, trouble, and expense, from various sources, and many of them of most difficult access. Had it not been for the private assistance of a few individuals, this number could not have seen the light, nor can we anticipate

* "We last week called the attention of the agriculturallists to the formation of an Anti Corn-Law Society, branches of which we are well advised will be established in different parts of the country. There is now an opportunity for the lauded

interest to fortify itself against the attacks of the Anti Corn-Law Society, by giving their support to an INSTITUTION in progress of formation, we allude to the 'NATIONAL INSTITUTION OF LOCOMOTION, for ameliorating the condition of the country by means of Steam Transport and Husbandry.' This INSTITUTION is perfectly unconnected with any trading company, and is therefore free from the suspicion which commonly attaches to schemes having individual gain for their object."—*The New Farmers' Journal*, 8th Nov. 1833.

that its circulation will be such as to enable us to realize our intention of publishing, three months hence, the first number of "*The Quarterly Journal*," unless we have funds, by subscription, put at our disposal, sufficient to remunerate those writers whose services we are desirous to avail ourselves of, and those draughtsmen whom we must employ to furnish the plates and plans essential to elucidate our subject. What we have therefore to propose is, that the Agricultural Societies, the Canal, Steam Carriage, and other Companies or corporate Bodies, should each become annual subscribers for the work at the rate of two guineas yearly; and that all private individuals interested in promoting these objects should be subscribers to the amount of one guinea yearly. For these subscriptions they will be furnished with copies of the work, and besides enabling its conductors to accomplish the object which they have in view, they will become Members of the National Institution of Locomotion, and be entitled to all the privileges and benefits which will accrue from it should the proposal respecting it, above submitted, be realized.

It is requested, that during the next two months, the names of such associate bodies, and gentlemen as feel inclined to become subscribers, will notify them to us*; and we will be glad to add to the roll of the INSTITUTION OF LOCOMOTION, the names of all who choose to become its Patrons and Donors.

We have only to express our hope that the importance of this PERIODICAL will recommend it to the attention and support of all classes and orders of the community. If the cry now raised for cheap bread from abroad can be met by a method which will raise cheap bread at home, assuredly it is the interest of all parties that it should be adopted. Let not the landed classes of

Great Britain sacrifice themselves by thinking that they can evade the former, except by promptly adopting the latter. The application of Steam to economic uses comes into operation at a moment, when it has been proved by an Honorable Member in his place in Parliament, that since 1814, our population has increased 25 per cent. our poor-rates 300 to 400 per cent.—emigration 4000 per cent.—insolvencies 100 per cent.—and Irish pauperism 100 per cent.;* nor will it only cheapen the production, and save the consumption of food, but it will do it in a way that will immensely increase manual labour. We trust, therefore, that the patronage both personal and pecuniary, of the nobility and aristocracy, will be liberally extended towards an INSTITUTION which proposes an object which all who are grieved at the distress of their fellow-subjects, and who are anxious to relieve it, must acknowledge to be of the utmost importance. The project before us extends itself to the almost indefinite improvement of the general industry of the working classes; and for good is vast and potent, as the evil which oppresses us. Our obligations to advance the same are powerful as religion, morality, patriotism, philanthropy, combined, can make them. Of England, when foreign levy assailed her without, it was once the proud boast that she could expect every man to do his duty: and when was the call ever unresponded to? But England, "fallen from her high estate, and and weltering in her blood," from domestic treachery and civil broils within, now DEMANDS that every man shall do his duty; and shall her cry be disregarded? This is a crisis in our Country's destiny:—and in her parishes and counties, her towns and villages, are to be achieved nobler and more enduring names than were ever gained upon the cannoned deck, or on the tented plain! The men who shall now put

* Letters, post-paid, to be addressed to the Editor of "*The Quarterly Journal of Steam Transport and Husbandry*," Mr. Mortimer's, Publisher, 2, Wigmore Street, Cavendish Square, London.

* See Mr. Cayley's Speech in the House of Commons, 23d May last.

themselves prominently forward to the good work of advancing this most beneficial and extensive purpose, will become "household words" with all posterity: not because with belt and brand they waded through blood and tears to add

a depopulated territory to Britain. But because in HER own hour of distress and need, by their mind and means, they enlarged ARTIFICIALLY all her borders, and gave her renewed life and light—prosperity and peace—health and happiness.

CANAL NAVIGATION.

*Letter to N. Wood, Esq. on that portion of Chapter IX, of his Treatise on Rail-roads, entitled, "Comparative Performances of Motive Power on Canals and Rail-road." * By Thomas Grahame, Esq.*

On the Resistance of Water to the Passage of Boats upon Canals, and other Bodies of Water, being the Results of Experiments, † made by John Macneill, Esq. M. R. I. A. Member of the Institution of Civil Engineers.

So far back as 1831, Mr. Grahame published the Letter above quoted for the purpose of setting the public right with respect to the comparative merits of the two rival species of internal communication, CANALS and RAIL-ROADS. At this remote date it is perhaps sufficient merely to copy the Extract from the Minutes of the Committee of Council of the Forth and Clyde Canal, as to the merits of this production.

"RESOLVED,

"That Mr. Grahame be requested to allow the immediate publication of this Letter, by which it appears to the Committee, that the real state of facts on this important question will be satisfactorily brought before those whose knowledge and experience enable them to form a correct opinion upon it, and by which the public mind will be disabused respecting the unfounded notions at present entertained by many persons regarding the first cost and maintenance of Rail-roads, and the economy

of the moving power on them compared on these points with canals."

That these opinions were correct at the time they were made, though directly opposed to all the theories and calculations of the Rail-road speculators, the second article in this Number now makes sufficiently apparent. It was the strong hold of Mr. Grahame's argument, *versus* Chapter ix. of Mr. Wood's Treatise, that the comparison between these two species of internal communication was founded on *deduction* so far as Railroads were concerned, and on *performance* so far as Canals were concerned. How far such a mode of comparison was likely to be fair, we need not discuss. Mr. Grahame only did justice to his cause, as the event has shewn, when he declared, that had Mr. Wood kept by his promise on the subject of Canal motive power, he would not have troubled him with his "LETTER," but would have left his *Railway deductions and estimates* to be settled and ascertained

* London: Longman, Rees, &c.

† London: Roake and Varty, 31, Strand.

in the only sure and satisfactory way which he was acquainted with, viz. *performance and practice*!

Mr. Wood, however, did not keep his promise on the subject of Canal motive power, but put forth a table, from which the public were led to infer that a locomotive engine, working on a Railway, at fifteen miles an hour, is as cheap a power as a horse on a Canal, working at the rate of two miles and a half an hour. This supposition Mr. Grahame denounces as utterly at variance with truth, and on the contrary insists, "that motive power by horses and drivers can, in situations very unfavourable, be hired or contracted for at a *rate or charge on each ton per mile less than the mere sum paid for the coke necessary by Mr. Wood's own estimate, to drag a ton of goods on the Manchester and Liverpool Railway*, putting engineers and attendants, grease, oil, wear and tear, and replacement of the engines out of view altogether."

Mr. Wood next states, that the most effective speed at which a horse can work on a Canal, is at the rate of four miles an hour. This Mr. Grahame also rebuts, and shews that goods are conveyed along canals by the motive power of horses at a rate of speed double of that which he lays down, and even more. There is at present a canal passage boat dragged by horses, and which plies on the Ardrossan or Paisley Canal, between the town of Johnstone and Glasgow, a distance exactly of *twelve miles*. It is drawn by two horses guided by a boy, and carries sixty passengers, and the journey, including a considerable stop at Paisley to take in and let out passengers, and sundry short stoppages on the road, is regularly done in one hour and a half, which is at the rate of eight miles an hour, including stoppages.

It is not necessary to proceed with Mr. Grahame through his various analysis of Mr. Wood's tables, deductions, and assertions in favour of Rail-roads, compared with Canals; his rule of *practice and performance*, which he goes on to illustrate by

statements of facts, completely destroys that of his opponent's founded only upon *calculation and theory*. We have made these observations simply as introductory to a notice of Mr. Macneill's valuable work "*Upon the Resistance of Water to the passage of Boats upon Canals*," because it was the publicity made through Mr. Grahame's "*Letter*," of the high velocities attained in Scotland, which directed attention to the subject in England, and which led in particular to the very interesting series of experiments which Mr. Macneill has recorded.

Mr. Macneill commences his subject by some preliminary remarks upon the inaccuracy of those laws—if laws they may be called—which have hitherto been considered as regulating the resistance and impulse of fluids; and gives his readers to understand, that the formulæ of the philosophers, upon this branch of science, are nothing better than mere erroneous theories. In fact, the results which have been arrived at by the experiments that he conducted, are so much at variance with generally received deductions, that he says, he submits his pages with great diffidence to the consideration of the public. Adding, though he trusts it is clearly shewn that light goods and passengers may be conveyed upon canals at a velocity hitherto supposed to be impracticable, that his observations, are nevertheless, made in the hope that they may lead to a more varied and extensive series of experiments to ascertain the best form of boats both for Canal and general Steam Navigation. In this hope, we trust, he will not be disappointed: it is our firm opinion that a problem yet remains to be solved in conveyance upon water, which will be accompanied with as mighty advantages as shall flow from that which Gurney solved in conveyance upon land.

From a Work which is principally made up of eight tables of experiments and explanatory observations. First, of experiments made with different models on the

sheet of water in the National Gallery of Practical Science, Adelaide Street, for the purpose of ascertaining the law of resistance or force of traction at different velocities, and second of experiments made with the "Grahame and Houston" Iron Boat on the Paddington Canal, for the same purpose. There is little that we can extract that would be at all interesting to the general reader. As tending to the most important improvements in a branch of practical science, which has involved in its current operations a vast capital, the results are highly valuable, and they form a body of documents, to which, we doubt not, the scientific will direct their attention in all their subsequent researches into the laws of fluids. We shall not, however, dip at present into this intricate and hitherto undefined subject, but keep it open for a future opportunity. It is sufficient in this notice to state, though there is reason to believe that the best form of boat, capable of the greatest speed, and least injurious to the banks, has not been attained, that the conclusion arrived at by the whole course of the experiments is quite warranted, viz. that boats may be made to attain to a velocity upon canals of about ten miles an hour, without injury to the banks, provided they are properly constructed, nor with more exertion from horses, should they be used as the motive power, than what they are subjected to in the fast going coaches.

This conclusion rests not simply upon the experiments made by Mr. Macneill, but has been proved for years upon the various canals in Scotland, where Mr. Houston's swift boats have been introduced. Their complete success is best proved by the fact, that upon the Paisley canal, since 1830, the intercourse has increased from the rate of 32,831 passengers yearly, to 240,000.

We intend in our next Number to give a general review of quick boats upon canals, both in England and Scotland; and hope that the different Canal Companies will furnish us with the necessary informa-

tion. It will form one of the principal features of "The Quarterly Journal of Steam Transport and Husbandry," that a portion of its pages will always be open to advocate their interests, and we hope to merit their encouragement and support. We close this article with Mr. Macneill's concluding observations, and though to many they may appear overstrained, we are not ashamed to pin our faith to them; believing that there are more things to be done in conveyance both by sea and land than what is dreamt of in most people's philosophy.

"From the whole data furnished, then, by the above course of experiments, we arrive at the conclusion, that navigation, whether by traction or impulsion, by the oar or by the paddle, is yet in its infancy;—a bold assertion, perhaps, considering how long we have held dominion of the deep; but one, notwithstanding, which we hope to see amply verified by general practice before many years pass over us. Assuredly our boasted triumphs during the past, over the winds and the waves, will bear no proportion to those which are yet before us. Hitherto the attention of the shipwright has been directed to giving the vessel velocity through the water; but when the velocity already gained shall be aided by the advantage of decreased draught when the vessel is forced over the water, safety and comfort will be the alone limit to speed in nautical science. Shall we, then, when within sight of such important results, strike the sail of the little skiff by which the discovery has been made, and ride quietly at anchor, content to know that there lies within our reach what will bring so much nearer to our shores the commence of the world? Or shall the enterprise of this great commercial land at once promptly furnish the means of confirming the accuracy of the above assertion, by a course of experiments proportionate to the magnitude and importance of the subject, and adequate to bring such improvements into general navigation practice? Time will

show,—we hope soon and trust favourably. Little will it say for the spirit of our country, if there be not a growing aptitude to shake off the etouderies of the past, and to improve a science which tends so much to the common good. The steps now taking by the canal companies, in order to give premiums for good and quick boats, is worthy of example. And that department of government which wields our triumphant navy, and to whose spirited conduct we are indebted for so many experiments in the steam marine, will not, we feel convinced,

leave this important investigation to the industry and enterprise of individuals alone, but will, in the true spirit of their great trust, by a hearty extension of that power which has given to the mariner the ability of steering a direct course over ‘the mountain wave,’ enable him also to abridge, with advantage to his country’s wealth and strength, the toils and perils of his ‘home upon the deep’” p. 41, 42.

The length of our second article has prevented us from going further into this most important subject.

STEAM COMMUNICATION WITH THE EAST INDIES.

*“Observations on the advantages and probability of successfully navigating Steam Ships between this Country and the East Indies.” **

We resume this subject from the fifth Number of the “Journal of Elemental Locomotion.”

The following are the outlines of the two plans by either of which Mr. Seaward would undertake to navigate vessels to India in little more than half the time now required to sail a ship to that distant region. The one plan is the adopting Steam power as the primary agent, and wind and sails only as assistants. The other plan is to adopt the Steam power as an auxiliary, to be employed only during the prevalence of calms or foul winds.

“Agreeably to the *first plan*, we propose that the vessel should be of the greatest possible length consistent with strength, her burthen to be about 1,200 tons, and to be furnished with a pair of engines of 200-horse power, with all suitable accommodation for passengers and crew; the whole to be fitted up in a plain economical manner, but at the same time on the strongest and most efficient principle. Such a vessel, with her engines, equipments,

and every requisite ready to proceed on her voyage, might be fitted out very well for a sum not exceeding 50,000*l.*; being little more than was expended upon the “*Enterprise*,” a vessel of about one-third the capacity. This vessel would run upon an average 10 miles per hour, supposing steam to be employed all the way; and as the distance to Calcutta, agreeably to the course adopted by the outward bound ships, is somewhat under 14,000 miles, the steam ship would be able to go that distance in 60 days, to which some days must be added for unavoidable stoppages and delays. When the Dutch fitted out the *Atlas*, they made her so large, with the intention that she should take a sufficient supply of coals to go the whole voyage from Holland to Java. They have no settlement at which they could touch in their course to get a fresh supply, and not willing to stop at a foreign port, they resolved in this respect to be quite independent. But as regards the British empire, such an arrangement would possess no

* London: Birchall, 8, Poultry.

sort of accommodation, it would be a sacrifice of too many other important advantages for the sake of an uncertain benefit; there are many settlements or friendly ports at which an English steam ship might touch for supplies in the passage both out and home, without much delay or inconvenience; we should therefore propose that the vessel should take out enough coals for 20 days consumption only, and to obtain further supplies, should stop at any of the following places, which circumstances should point out as being most suitable—namely, the Canary Islands, the Brazil, St. Helena, the Cape of Good Hope, the Mauritius, &c. at all which places dépôts of coal or wood should always be kept in readiness; these delays would increase the time necessary for the voyage to about 66 days, supposing the whole distance to be run with steam power, and but little assistance derived from wind and sails.”

“A supply of coals to enable the vessel to steam for 20 days would be about 400 to 450 tons; the weight of the engines, machinery, &c. would be about 150 tons, making altogether about 600 tons; therefore there would still be ample space and tonnage for merchandize, provisions, and accommodation for 100 to 150 passengers; but as the vessel would be destined for a fast packet, it would not be advisable to increase the whole loading to more than about 850 or 900 tons, which would still leave the vessel sufficiently light to steam through the water with excellent speed.”

“By the *second plan* of navigating ships to India, partly by wind and sails and partly by steam power as an auxiliary, we propose that the size of the vessel should be increased to 1,600 tons burthen, but furnished with engines of the same force as the former, viz. of coals; this quantity we calculated would be ample to carry the vessel one-half the voyage, consequently it would be necessary to touch at only one port on the passage for a further supply. A vessel of this description would, inde-

pendent of the engines and machinery, coals, &c. carry a lading of 600 tons of merchandize; and in that state the steam power would propel her at the rate of nine miles per hour through the water; but in this case the steam power would be only as an auxiliary when the winds were foul or in the prevalence of calms; for this reason we would recommend that the steam ship should by no means deviate from the track usually taken by vessels sailing to and from India; by this mode we would undertake to navigate a vessel from London to Calcutta in 74 days with ease and certainty.”

“Both the above plans possess their respective advantages—the first has the undoubted preference as regards the shortening the time of the voyage; for a fast packet, destined to convey despatches and passengers, to form the most expeditious mode of communication with our immense possessions in the East, this plan deserves the first attention; but as regards economy, the second is unquestionably preferable; for not only may the voyage in that way be accomplished with about half the expenditure of fuel, but the vessel would then be enabled to take three times the quantity of merchandize. By either of these plans, however, it is most certain that a ship might be navigated to India in one-half the time that, on the average, is expended by sailing vessels on the same voyage.”

We should now have come to those considerations which we also reserved for this concluding notice, viz. to prove that by the agency of Steam, this wonderful celerity can be communicated to an Indian voyage without any sacrifice of property, or other valuable considerations, that could in any respect render this immense benefit nugatory, or even problematical.

So much improvement, however, has been made in the machinery of Steam vessels, and reduction in the consumption of fuel since 1829, the date of Mr. Seaward's Pamphlet, that we do not consider

it necessary to do more than refer our readers to the observations upon the size, equipment, tonnage, &c. of steam ships, by which we arrive in a very satisfactory manner at the conclusion to which he leads us. Believing that if then "upon the whole he was duly warranted in affirming that the tear and wear of the machinery will be far less than what usually takes place in the sails and rigging of an ordinary sailing vessel," and that "the destruction upon the hull of a vessel, as some suppose, is much greater where steam power is employed than when the vessel is navigated by sails and wind, is a *very great mistake* ; for experience fully proves the contrary to be the fact,"—we are doubly warranted to believe the correctness of these statements now. Nor do we anticipate that any of our readers will differ with him, or us, in thinking that "it will be unnecessary to enter into any further detail of the other immense advantages which must flow from the adoption of this measure: they are numerous and important, and cannot fail to present themselves to the mind of every one who has at heart the welfare of our *Indian* possessions."

Believing in the correctness of Mr. Macneill's statement (see the preceding paper), that "we are only in the infancy of navigation whether on sea or canals;" and further that the public mind is every day

approximating to this conclusion, we shall, under the head of STEAM NAVIGATION, in the future labours that lie before us, often have occasion to direct our attention to this most important and interesting subject. Now that India is to be thrown open to British enterprise, we know of no object better worthy of public solicitude than that which will bring our eastern empire a half nearer to our shores. To all who agree with us in this opinion, and who are desirous to aid in its accomplishment, our pages will afford a vehicle of making their sentiments general.

We shall here conclude our review of Mr. Seaward's observations, with the remark, to which we fully subscribe, "that the advantages which would result from employing Steam power to facilitate the intercourse with the East are of that apparent and urgent nature, that no question can exist but the measure will sooner or later be adopted." That such an event should be accomplished by Mr. Seaward, he has our best wishes ;—but by whomsoever, it will be most grateful to our feelings to offer our assistance in the furtherance of this great object, convinced as we are of the important influence it will have, both in a political and commercial point of view, on the welfare of India and of the British empire in general.

CHAPTER RETROSPECTIVE.

As the present number concludes "*The Journal of Elemental Locomotion*," and is prefatory to a Quarterly Publication, in an enlarged form, upon the same subject, we may be permitted to state afresh the object which was proposed in commencing the periodical, and how far it has been realized.

Gurney, whose name as the extender of

Steam to economic uses will take a higher place in the gratitude of posterity than Watt, the applier of it to physical, after bringing his invention to a degree of perfection, that a Committee of the House of Commons reported it to be "one of the most important improvements ever introduced,"—that "its practicability is fully established," and that "legislative protec-

tion should be extended to Steam Carriages with the least possible delay," thus concludes the Pamphlet which he published in February 1832. "Having necessarily attached myself personally to the subject up to this time, having had to contend with difficulties of no common description, which have long harassed my mind, and compelled me to neglect the duties seriously due to myself and family; having conducted it up to a point, when no further individual exertion can be useful: having placed the plain facts connected with the subject before the public, and shewn that the great problem of propelling carriages by Steam on common roads has been solved, I shall now retire to other pursuits, until the moral and political difficulties previously stated, are so far removed as to shew that further individual exertion may be useful. When this is the case, no considerations while I have life and health, shall prevent my returning to the further prosecution of this immensely important subject." Where Gurney left off, our labours began. His were to overcome the inertness of matter, ours to overcome the resistance of mind. The *physical* difficulties were to attain the *POWER*, the *moral* to form the *WILL* necessary to make that power available.

For this purpose we projected the Periodical of which this is the concluding number; and notwithstanding the difficulties we have had to encounter, supported by the conviction that the arguments which we have advanced are all founded in truth and reason, and encouraged by the favourable reception which they have met with from many enlightened and distinguished authorities, we have gone forward almost single handed to prosecute researches in this new and unexplored domain of economic science.—and to lay the foundation of a school, which, in contra-distinction to the theoretical ones, may be styled that of the *hammer and spade*, for it directly proposes the formation of a community at home, who can make cheap

bread, and be so remunerated at home, as to consume 'prosperously commodities made at home.

For this purpose we have addressed successively in the different numbers of "*The Journal of Elemental Locomotion*," the landed, the manufacturing, and the working classes, upon the common advantages which will arise to each from the introduction of a measure which will cheapen food, and extend manual industry at home, in preference to having cheap bread by the method agitated by the anti-corn-law party: a method which would not only aggravate the evil which it proposes to remedy, but which would inevitably unbalance production and consumption to an extent which would shortly plunge society into anarchy.

That we have succeeded so far in awakening public attention to the importance of this project, we have to thank the daily and periodical press, which cordially, and almost unanimously, has supported us in the views which we have taken of this subject.* In the hope that we shall receive their enlightened and powerful aid, and belief, whether or not, that our labours will neither prove vain nor unblest, we now close this first volume, which, whatever may be the multitude of its defects, has at least its good intentions to cover them.

That there is some fatal impolicy in our social condition is but too obvious; that it demands instant and extensive revision is but too certain. Else, why after nineteen years of peace, and what ought to have proved recruitment, has the sere and yellow leaf of *national decadence* come upon us? Why, whilst ocean groans under the pressure of our deeply laden barks, bearing to our shores the rich tribute of all lands, do the winds of heaven fill the canvass of those who annually bear away thousands of our expatriated countrymen, who are torn *involuntarily* from all that is most dear and precious to

* Vide notices of the Press annexed.

their affections? * Why is Ireland, with her fertile soil and beneficial climate ulcered over with squalid poverty, the scene of constant insubordination, misery and crime? Why is the voice of once MERRY England turned from gladness into agitation and woe? Why does the vigorous pulse of Scotland beat in a feverish and unwholesome tone? Why does the cry of wretchedness arise in all our districts, and beggary appear in every corner of our streets? Alas! hankering after foreign relations, instead of minding the one thing needful, viz. to provide at home, that extended consumption should bear an adequate ratio to extended production, has been the fatal rock upon which the vessel of our common prosperity has split. Owing to this error it is, that notwithstanding all our ascendancy in the arts of industry, we have forced our domestic population into a condition which makes vain and desperate all NATURAL aids for any purposes which are more than palliating. And now we must retrace our steps, and regenerate society by the ARTIFICIAL means which the progress of invention has at length put within our power. To accomplish this, our labours have been, and still shall continue to be, directed; unless the clique whose system it is,—pursuing the shadow and losing the substance—to make the worse appear the better reasoning, turn the edge of an argument away, and make it lose the name of action. It is not that elementary power should be applied in a way that will cheapen, accelerate, and improve conveyance, that we have taken up a subject which might have ended only in urging it prematurely, and

improvidently, into operation. No,—BUT IT IS BECAUSE THE REMOVAL OF BRUTE LABOUR WILL INCREASE HUMAN LABOUR, AND CHEAPEN FOOD OF HOME GROWTH, AT A MOMENT WHEN THE WANT OF THESE IS THREATENING THE PEACE AND STABILITY OF SOCIETY; THAT WE SEE A CASE SUFFICIENT TO MAKE THE NATION TAKE UP THIS SUBJECT AS A NATIONAL MEASURE. This is the object which we have prominently before us,—and which we would move all parties and conditions to accomplish. The substitution in question has already been retarded for several years, from no other circumstance than want of co-operation: and if it be delayed for a few more that convulsion may take place which, through the good providence of God, it seems provided to obviate. The power is now given us to remedy, by *artificial* means, evils which, situated as the country is, could not have been remedied by any *natural* ones. Shall the means then be wanting? We have already appealed to the landed interest to promote its introduction. But this is the duty of no particular class—for it contemplates the welfare of our whole community. We call therefore upon all orders to forward it as the most effectual and extensive mode of improving our social condition. At a moment of such need, when so many and urgent claims are pressing upon the attention of the benevolent, it becomes them to reflect that *here is a way of administering relief which will go far towards annihilating our distress instead of simply changing its character*. With the groans then of millions of our fellow subjects ringing in our ears, we turn to those who are about to expend their thousands, and tens of thousands, upon the manes of men who require that no column upon their native soil should attest their remembrance, for their names will live in the east and west for EVER, upon the hearts of generations whom their noble philanthropy has liberated and saved. Let the friends of Wilberforce and Malcolm,—or rather,—for there is no

*The number of emigrants who landed at Canada last year were no less than 66,339, whilst about 32,872 went to the United States. Mr. Buchanan, the Government Agent, states the value of property taken with the former, at 600,000*l.* to 700,000*l.* This is an evil of a crying magnitude, and ought to be evaded by the earliest possible exportation of our horses. To encourage colonization is one thing—to encourage it at such sacrifices, moral and pecuniary, is another.

friendship between the living and the dead,—let the friends of the GREAT CAUSE OF HUMANITY AND MAN, which they lived to promote, consider that the sum of 350,000*l.*, now required to commence this undertaking will,—over and above all the collateral advantages to arise from the employment that will be afforded in forming the road, from accelerated conveyance, and circulation of capital from increased intercourse,*—be so invested as to sweep away the brutes which now consume annually what would feed FORTY THOUSAND of our starving people, and secure constant occupation and independence for upwards of TWENTY THOUSAND FAMILIES, and then think whether, at such a moment of exigent and threatening distress,† any better object can claim the appropriation of their FUNDS. Is it a moment to found schools, and endow hospitals, when the schoolmaster and poverty are universally abroad? Situated as we are, food and work are necessities, the other *superfluities*. The DONATION FUND of the INSTITUTION OF LOCOMOTION, under the management of parties in whom the public may place implicit confidence, is intended to accelerate the general introduction of a pro-

ject which in a great measure will render unnecessary all those other benevolent associations which are now labouring for the improvement of the lower orders. Upwards of one hundred thousand pounds, independent of years of toil and discouragement, has been expended by the individuals who have matured the project. Shall then the nation fail liberally to second their generous exertions? It is not a small matter which contemplates the regeneration of Great Britain. Parliament has given 20,000,000*l.* to break the chain of slavery abroad,—let it not withhold 10,000,000*l.* to break also that worse than serval bondage, the chain of pauperism, which is unchristianizing society at home. We have spoken of the vast POLITICAL benefits which will flow from the general introduction of this measure. The COMMERCIAL benefits which will result from a mode of conveyance which will concentrate the energies of the country—economise valuable time—open up to more distant parts of the empire the avenues of wealth and industry—generalize those necessities which want of rapid communication, or its expense, now confines to local markets—spread the inland tables of all classes and ranks with the rich but perishable bounties of the deep,

* What this will amount to may be guessed at from the fact that improved conveyance between Glasgow and Paisley has since 1830 increased the annual intercourse from 22,831 to 240,000! and during the last year between Edinburgh and Dalkeith, from about 1,000 to 50,000. A triumphant exemplification of the utility of expeditious and cheap conveyance, and of its power of reproducing work for itself. See *Macneil's Canal Navigation and Chambers' Journal*.

† A society has sprung out of the trades' union in Manchester, called the society for national regeneration. In this it is proposed to found a new order of things—to reduce the hours of labour to eight per diem, and to keep the same rate of wages. A catechism is appended to the rules, containing amongst the most revolutionary doctrines, the most artful appeal to religious prejudices, and holding out prospects to the workmen which common sense shows can never by any possibility be realized. Some letters which have appeared in the *Morning Chronicle* throw a little light upon the object of these unions. These declare boldly that the aristocracy is a nuisance, and must be abolished! that there shall

be no longer an unequal distribution of property! that a new state of society is contemplated! that spoliation and agrarian law must take place! and that individual suffering must be endured for national good! The rights of property are there represented as belonging to none individually, but to all generally; none are to enjoy the fruits of former industry and enterprise; and those who do not now stoop to produce are not to enjoy! and we are told that societies are formed and linked together in England, France! and Germany, all actuated by the same intentions, and all aiming at the same object.—*Standard*.

Whilst the lower orders are thus at work over the whole kingdom, we repeat the question, what has the higher orders done to counteract them?—We say with Blackwood, in his last number, "Let the higher orders beware, and take counsel in time. They appear absolutely blind to the state of the country, even when their more clear-sighted inferiors have lost hope: too many of them will be feasting like Belshazzar, when the hand-writing on the wall is before them in characters of fire!"

with a profusion corresponding with their inexhaustible abundance—and, in a word, circulate over the entire face of society, those edible productions, of whatever kind, which carriage now makes the monopoly of wealth, are all self-apparent. But there are MORAL BENEFITS also sufficient to recommend it to the support of the humane and good of every denomination. The release of the noble steed from the cruel dominion of the rein and whip, will release us from the moral degradation which invariably accompanies the infliction of the latter. The sweeping away of the worthless brutalized class of society, their attendants, who now fill the gin-shops within, and the streets without, with contamination and depravity, will improve the whole tone of the neighbourhoods in which they domicile. Nor as respects health and cleanliness, will the clearing away of the Augean stables of all our large towns with their filth and pollution, be less than blessed. At the present moment, the vast lazar houses in which are overcrowded the trading and manufacturing portions of our community are enveloped in atmospheres impregnated with the effluvia and contamination of oppressed and diseased brute nature. The power which will remove these, and operate all the important and desirable changes which we have attempted cursorily to enumerate, will also give to the poor the most enviable property of wealth—that of LOCOMOTION. The walls of the eternal City will no longer surround multitudes in the lower walks of life, who live and die in the impure air of their confined enclosures. But from saving time and shortening distance, it will put within the reach of all classes of the people, for their health and recreation, to

familiarise themselves occasionally with the rich land which forms their inheritance—to inhale the pure invigorating element—to smell the sweet breath of nature—to see the towns and towers, the mountains and domains, the lakes and rivers of imperial Britain—to hear the hum of her busy population—to know the lights and shades, the aspect, manners, and modes of human life, through all the length and breadth of man's industrial and social communities. Nor is this all; the power which will invigorate the body will also refine the soul. It is the chains and trammels of earth that make so many earthy. The bondage of care, of toil, and of penury—fretting care—unremitting toil—cheerless penury—which deadens the crowd alike to the objects of time and of eternity. Unclog these, and the unthankful lips will learn the accents of gratitude. Things that concern the everlasting peace will find a place when the concerns of the perishing body cease to be perpetual: and millions will put on the spirit of praise, when they can put off the bondage of heaviness. Discontent will then no longer brood over the land, nor sedition be busy at work amongst us. Disloyalty will hide its revolting head, and immorality shrink down from its bloated dimensions. Religion and loyalty will walk hand in hand through our happy, attached, and prosperous habitations. And Britons again proud of the days and deeds of other times, when their country “filled the ear of empires and never bent or bowed to foreign powers,” and worthy of their own, will leave to the ages that are about to succeed, the enduring inheritance of their piety, their liberty, their unanimity, and their peace.

LIST OF NEW PATENTS.

Granted between the 20th of November and 22nd of December, 1833.

John Cooper Douglas, 5, Great Ormond Street, Esq., for certain improvements in the construction of furnaces for generating heat, and also in the construction of apparatus or vessels for applying heat to various useful purposes. Six months; November 19.

John Cooper Douglas, 5, Great Ormond Street, Esq., for certain improvements which prevent either the explosion or the collapse of steam and other boilers from an excess of internal or external pressure. Six months; November 19.

Marcel Roman, of St. Michael's Alley, Cornhill, merchant, for certain improvements in or additions to apparatus or methods employed in throwing or winding silk or other threads. Four months; November 19.

Barthelemy Richard Comte de Prédaval, of Leicester Place, Leicester Square, engineer, for an engine for producing motive power, applicable to various purposes. Six months; November 19.

Stephen Perry, of Wilmington Square, Clerkenwell, gentleman, Edward Massey, sen. of 20, King Street, watchmaker, and Paul Joseph Gauci, of 10, Charles Street, Middlesex Hospital, artist, for certain improvements in pens and penholders. Six months; November 19.

Daniel Ledsam and William Jones, both of Birmingham, screw manufacturers, for certain improvements in machinery to be used in the manufacture of pins and needles. Six months; November 21.

John Cooper Douglas, 5, Great Ormond Street, Esq., for certain improvements for depriving vegetable juices and fermented and distilled liquids of their acid qualities,

also of their colouring matter and essential oils. Six months; November 21.

Henry Hardingham Leggett, of Fulham, gent., for certain improvements in the art of printing in colours. Six months; November 23.

Thomas Parsons, of Newport, gent., for certain improvements in locks for fastenings. Six months; December 3.

John Hall, of Breezes Hill, Ratcliffe Highway, sugar refiner, for certain improvements in filters for sugar and other liquids. Six months; December 6.

Joshua Wordsworth, of Leeds, machine maker, for certain improvements in machinery or apparatus for heckling flax, hemp, and other fibrous substances requiring such process. Six months; December 6.

Ernst Wolff, late of Leeds, merchant, but now of Stamford Hill, Middlesex, gent., for a mode or modes of supplying stoves with heated air, without bellows or blow-pipe, being a communication from a foreigner residing abroad. Six months; December 7.

John Baptiste Constantine Forassa, of Newington Causeway, Surrey, gent.; Paul Isaac Muston, of Austin Friars, merchant; and Henry Walker Wood, of the same place, merchant, for certain improvements in making or producing the pigment, commonly known by the name of white lead, or carbonate of lead. Six months; December 11.

Thomas Affleck, of Dumfries, merchant, for certain improvements in the means and machinery for deepening and excavating the beds of rivers, removing sand-banks, bars, and other obstructions to navigation. Six months; December 11.

Riley Carr, of Sheffield, manufacturer, for certain improvements in machinery for cutting, cropping, and dressing woollen and cotton cloths. Six months; December 11.

Robert Stephenson, the younger, of St. Mary's Cottage, Downshire Hill, Hampstead, civil engineer, for an improvement in the mode of supporting the iron rails for edge railways. Six months; December 11.

John Wisher, of Vauxhall, Surrey, potter, for certain improvements in machinery or apparatus for grinding covers or stoppers for jars, bottles, and other vessels made of china, stone, or other earthenware. Six months; December 11.

Lemuel William Wright, of the London Road, Southwark, for a certain improvement or certain improvements in the combination and arrangement of machinery, or in apparatus whereby certain well-known agents may be employed in producing power, and in the mode of effecting the same, applicable to various useful purposes. Six months; December 16.

Thomas Sunderland, of Blackheath, Esq., for certain improvements in propelling vessels. Six months; December 19.

Charles Chubb, of St. Paul's Churchyard, London, patent detector lock manufacturer, and Ebenezer Hunter, of Wolverhampton, locksmith, for certain improvements in locks used for fastening and security. Six months; December 20.

David Rowland, of 68, Crawford Street, Marylebone, mechanic, for an improvement in the manufacture of sextants, quadrants, circles, and other instruments used in taking observations and surveys. Two months; December 20.

Louis Quintin, of the Sabloniere Hotel, Leicester-Square, carriage builder, for certain improvements in the construction of carriages. Six months; December 20.

James Hamilton, of Threadneedle Street, London, civil engineer, for certain improvements in machinery for sawing, boring, and manufacturing wood applicable to various purposes. Six months; December 20.

Thomas, Earl of Dundonald, for certain improvements in the construction and operation of rotary engines and apparatus connected therewith. Six months; December 20.

Josiah Gilbert Pierson, of New York, United States, but now residing in Ludgate Hill, London, merchant, for certain improvements in the constructions of bolts and latches, to be attached to doors and other situations where a secure fastening may be required. Six months; December 20.

John Paul Newman, of Cornhill, London, merchant, for certain improvements in making or producing leather from hides and skins, being a communication from a foreigner residing abroad. Six months; December 21.

John Howard Kyan, of Upper Baker Street, Esq., for a new combination of machinery to be applied to the present purposes of steam navigation, in aid of and in substitution for the motive power, hitherto and at present obtained and afforded by the application of steam. Six months; December 21.

George Dickinson, of Buckland, near Dover, paper maker, for an improvement or improvements applicable to making of paper. Six months; December 28.

CONTENTS of the Six Numbers of "The Journal of Elemental Locomotion," to which this Number is supplementary.

CONTENTS OF No. I.

1. Chapter Prospective.
2. Cursory Outline of the general Practical Results of Steam.
3. The Substitution of Inanimate for Animate Power considered, as it will affect the Agricultural Interest.
4. The best mode of Locomotion considered.
5. Estimate of the Advantages to arise to the Metropolis from the Introduction of Elemental Locomotion.
6. Opinions of the Committee of the House of Commons, and Public Press, upon the Practicability of running Steam Carriages upon Common Roads—and Hints for the formation of a Company.
7. Extracts from Gordon's Treatise upon Elemental Locomotion—(general advantages.)
8. Important Inventions and List of New Patents.

Accompanied with a Plate of Thirteen Views of Steam Carriages.

CONTENTS OF No. II.

1. The introduction of Inanimate Locomotion considered, as it will supersede the Corn Laws.
 2. The substitution of Inanimate for Animate Power further considered, as it will affect the Agricultural Interest.
 3. The substitution of Inanimate for Animate Power further considered, as it will affect Coach-Proprietors and Inn-keepers.
 4. Journey to Brighton—*With a Plate.*
 5. The Edinburgh and Foreign Quarterly Reviews, Reviewed.
 6. Discoveries of General Utility.
 7. Patents for the Month.
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CONTENTS OF No. III.

1. Canals and Railways compared.
2. Steam Cultivation and Transport considered, as they will Improve the Condition of the Working Classes.
3. Digest of the Evidence, on the East India and China Question, before the Committee of the House of Commons.
4. Advantages of Steam Culture and Inland Transport to the Manufacturing Classes, as regards Free Trade.
5. Review of Reviewers.
6. Miscellanies.
7. Patents for the Month.

CONTENTS OF No. IV.

1. Suggestions for a more perfect Steam Drag.—*With a Plate.*
 2. The general Improvement of the Country, by Inanimate Conveyance, in Commerce and Agriculture.
 3. The present State of the Liverpool and Manchester Railway.
 4. Messrs. Ogle and Summers' Experimental Journey from Southampton and Liverpool and thence to London, in their Steam Carriage.
 5. Institution of Civil Engineers—Proceedings.
 6. Central Union Canal.
 7. Conveyance of Letters and Dispatches.
 8. Digest of the Evidence, on the East India and China Question, before the Committee of the House of Commons.
 9. Application of Suspension Bridges.
 10. Miscellanies.
 11. Patents for the Month.
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CONTENTS OF No. V.

1. Phillips' Steam Plough.—*With a Plate.*
 2. Steam Agriculture.
 3. Advantages of Inanimate Agriculture and Transport to the Working Classes.
 4. Steam Communication with the East Indies.
 5. Digest on the Evidence, on the East India and China Question, before the Committee of the House of Commons.
 6. Institution for Promoting Steam Conveyance and Agriculture.
 7. Miscellanies.
 8. Patents for Two Months.
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CONTENTS OF No. VI.

1. Upon the Duty which Capitalists owe to the Country, of checking Misconfidence and affording Employment.
2. Upon the moral Advantages which will arise to Society from the suppression of Animate Locomotion.
3. Railways and Canals compared.
4. Institution of Civil Engineers.
5. Undulating Railway.
6. Meeting of Noblemen and Gentlemen to promote the formation of a Society for the Amelioration of the Distress of the Country, by means of Steam Transport and Agriculture.
7. Steam Carriages.
8. Mr. Hancock's New Steam Omnibus.
9. Rejected Address of the Mechanics' Magazine.
10. Miscellanies.
11. List of Patents.

CONTENTS OF THIS No.

1. Review of the Report of the Agricultural Committee; and *exposé* of the danger that will arise to the Agricultural Interest, if Steam Transport and Husbandry are not introduced simultaneously.
 2. Rail-Road impositions detected: or Facts and Arguments to prove that Rail-Roads never can compete effectually with Canals, Steam Carriages on common roads, or even Stage Coaches. Comprising a critical and statistical Review of all the Estimates now before the Public, both for construction and revenue; with comparative Tables of the *actual* and the *estimated* cost and profit, &c.; thus presenting the only safe guide yet published for future Investments: with summary of the Birmingham Railway Case, &c.
 3. General Review of Steam Carriages during the last six months, and calculations as to the expense of working them: with Report of the trip upon the Holyhead line, by a Committee of Engineers.
 4. Proposal for appropriating, for the use of the Public Purse, the vast Revenue that will arise annually from Inland Elemental Transit: with copy of Memorial submitted to Earl Grey for that object.
 5. Proceedings of the Institution of Locomotion: with Prospectus of the Quarterly Journal of Steam Transport and Husbandry.
 6. Canal Navigation: and Review of Macneill "On the resistance of Water to the passage of Boats upon Canals."
 7. Steam Communication with India.
 8. Chapter Retrospective.
 9. List of Patents.
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NOTICES

Of Mr. Gordon's "Historical and Practical Treatise upon Elemental Locomotion," and "Journal of Elemental Locomotion."

The following Notices of these two Works, by the Public Press, are selected from a great number of others equally recommendatory.

"The facts which Mr. Gordon elucidates from the parliamentary evidence of practical and experienced engineers, sufficiently convince us that elementary power can be rendered subservient to the purposes of locomotion in almost any circumstances. We are also satisfied that the improvements which have lately been made upon the steam engine, and the machinery of carriages, are such as to obviate every difficulty that has hitherto impeded the progress of locomotive engines on common roads. These facts are indeed established beyond a doubt."—*New Monthly Magazine*.

"We do not hesitate to say, that the information given in this Treatise is of the most vital importance to the interests not only of the British nation, but of the whole human race. Were the changes which are advocated and contemplated effected, it is impossible to calculate the beneficial results which would accrue to society. Steam carriages might be made to serve almost every purpose for which animal power is now employed."—*Edinburgh Evening Post*.

"The convulsions which our mercantile community has experienced within the last few years, seem to have produced a narrow-mindedness and selfishness among its wealthy members, and to have reared a species of barrier betwixt capital and labor. Misery has been the consequence alike to the hoarder of money, and to the starving pauper. The great revolution contemplated in our system of commercial transportations, appears to be the one principal means by which our Malthusian evils will be practically subverted. We have alluded to this subject for the purpose of awakening Christians and Philanthropists to its importance."—*Christian Advocate*, 4th Sept. 1833.

"The political advantages have been advocated by Mr. Broun : who, in a series of papers, addressed to the Agricultural and Commercial Classes, has laid the foundation of a new school of political economy, which immediately will prostrate those of Malthus and Ricardo; for, instead of expending itself upon unproductive theoretical researches, as to the cause of national wealth on the one hand or national poverty on the other, it at once proposes *practically* to make the wants of the people the fulcrum, and the conversion of steam to economic purposes the lever by which to raise up our whole prostrate interests, and achieve the formation of a community at home, who will make *cheap bread* at home, and be so remunerated as to be able to consume prosperously commodities made at home."—*Parliamentary Review*.

"We recommend the consideration of this subject to all those who desire to promote the prosperity and happiness of Great Britain. Our coal and iron are far more valuable than gold and diamonds : they are the ready means of putting in motion all the gigantic operations of our almost superhuman machinery : nothing is wanting but the means of giving life and impulse to the stagnant industry of the country."—*Courier*.

"With respect to the capabilities of the country to support its present population from food grown upon its own soil, we have been struck with this very clever Publication upon Locomotion, from which it appears that the substitution of inanimate for brute power will be the fair and only means of remedying pauperism."—*London Literary Gazette*.

"To the political advantages of steam carriages, their great unity, strength, and consequent security, their effect in drawing together the different parts of the empire,

in diffusing throughout the whole the common feelings as well as the common interests, and in increasing the efficiency of its means of defence—must be added to their certain results of developing its natural powers of sustaining and rendering happy an increased population.”—*Globe*, 17th Sept. 1832.

“This may well be called a national project: for in our own belief it is the commencement of a new and brilliant era in our own country.”—*Dumfries Journal*.

In every way “we do look forward to the change as the instrument of great good. If, while it provides us with an accelerated mode of conveyance, economizing valuable time, and concentrating the energies of the

country, it also opens up to more distant parts of the empire the avenues of wealth and industry; if, while it diminishes the amount of cruelty to brutes, it also prevents that moral degradation which invariably accompanies its infliction. If we shall succeed in displacing horses, by the very machinery that formerly displaced men, and thus remedy, by machinery, a few of the evils of which it has been the cause; if, by diminishing the consumption of corn, we take one penny from the price of the poor man’s loaf, or one pang from the ills of his lot, we shall attain a high and noble end—an end worthy of ‘a Newton’s genius and a nation’s boast.’”—*Foreign Quarterly Review*, Oct. 1832.

* * * These Works are published by B. Stuart, Cheapside, and also to be had at Mr. Gordon’s Office, 37, Southampton Street, Strand.

